



# Examensarbete i ämnet biologi

2011:2

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## **What factors correlates with the use of game meat, wild fish, berries and mushroom in Swedish Households?**

**- Urban vs. Rural areas**

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**- Urban vs. Rural areas**

*Vilka faktorer samvarierar med användandet av viltkött, vildfångad fisk, bär och svamp i svenska hushåll?*

*- Stad vs. Landsbygd*

**Jerker Hellstadius**

Keywords: Urban, rural, berries, mushroom, game meat, fish, correlation

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## **Abstract**

This study was made to see to what extent Swedes use consumptive resources such as berries and mushrooms, game meat and meat from fish in their household on a yearly basis. I have also looked into the difference between rural and urban areas in Sweden. Further aim was to determine what factors that correlates with the participation in berry and mushroom picking and the use of game and fish meat within the household. The study was conducted in form of a mail survey that was sent to randomly chosen persons in every municipality in the six northern most counties in Sweden and in the county of Stockholm. In addition a sample was sent to randomly chosen persons on a national level.

The results showed there is a difference in use between rural and urban areas in Sweden in all 4 investigated consumptive resources. Factors that correlated with berries and mushroom picking was age and access to a summer cottage. Factors significant correlated with use of game meat were sex, education and access to a summer cottage. Also for the consumption of fish access to summer cottage showed a significant correlation as well as education, sex and age. The differences between rural and urban areas is most likely due to the higher access of good conditions for berries and mushrooms in rural areas, the more available forestland and less competition due to the low amount of inhabitants. For the consumption of fish it is most likely due to better access to good fishing waters in rural areas. Another important factor that influences to what extent a household uses consumptive resources in their household is the social bond that thigs you to using this resource in a higher extent in rural areas than urban areas. You are more likely to know somebody that usually picks berries and mushroom, fish or hunt in their spare time in a rural area and therefore might learn and introduce you to that activity. Summer cottage showed a significant correlation to all of the consumptive resources and this is probably because you get closer to good habitats with high productivity of berries and mushrooms. This factor also provides better access to good fishing waters and good connections with the local people that might give you valuable fishing tips. Finally it might also provide you with hunting possibilities if you would like that. The positive and significant correlation with age for both picking berries and mushrooms and fishing indicates that older people are more likely to conduct these activities. The effect of sex on the use of fish and game meat both provided by someone within the household and not, shows that males are more likely to hunt and fish. Education is another factor that affects those consumptive resources and my result showed that lower levels of education have a positive correlation with hunting and fishing. My results also showed that males are more likely to hunt and fish and provide their households with meat. Income did not have any effect on the studied consumptive resources directly but it does affect if you have a summer cottage or not which in turn affects all of the consumptive resources that was studied.

## Sammanfattning

Rapport behandlar i vilken utsträckning Svenskar årligen utnyttjar konsumerbara resurser så som bär och svamp, viltkött och fisk i hushållet. Jag har också studerat skillnaden mellan städer och landsbygden i Sverige. Vidare har jag också försökt urskönja vilka faktorer som påverkar om man deltar i bär och svamp plockning och i användandet av vilt och fisk kött i hushållen. Studien utfördes i form av en brevundersökning som skickades ut till slumpvis utvalda personer i alla kommuner i de sex nordligaste länen i Sverige samt i Stockholmslän. Jag skickade också ut till slumpvis utvalda personer på en nationell nivå.

Resultaten indikerar att det finns en viss skillnad i utnyttjandet av alla de förbrukningsbara resurserna mellan folk på landsbygden och folk i städerna. Faktorer som samvarierar med bär- och svampplockning är tillgång till sommarstuga och ålder. För utnyttjandet av viltkött så är det tillgång till sommarstuga, utbildning och kön som är de signifikanta faktorerna. Även för fisk så har tillgång till sommarstuga en signifikant roll tillsammans med utbildning, kön och ålder. Det är troligt att skillnaderna mellan landsbygden och städerna till stor del beror på den större andelen bra och tillgängliga habitat för bär och svamp på landsbygden, den större andelen tillgängliga skogsområden på landsbygden samt den mindre konkurrensen på grund av ett lägre invånarantal. För fisk är det troligtvis närheten till bra fiskevatten som påverkar i stor utsträckning. En annan avgörande faktor som påverkar i vilken utsträckning ett hushåll utnyttjat förbrukningsbara resurser är förmodligen det sociala bandet som knyter en till att använda förbrukningsbara resurser i högre utsträckning på landet än i städerna. På landsbygden är det en större chans att du känner någon som brukar plocka bär eller svamp, fiska eller jaga på fritiden och via det kan du bli introducerad och lära dig den aktiviteten. Tillgången till en sommarstuga visade en signifikant samvariation med alla förbrukningsbara resurser som jag har kollat på och det kan förmodligen ha något att göra med det faktum att en sommarstuga på landet ger dig en bättre tillgång till skogsområden med utmärkta habitat och hög produktion av bär och svamp. En sommarsuga på landet ger dig också närheten till fina fiskevatten och du kan få bra kontakt med det lokala folket som kan komma med tips om fina fiskevatten och de kan också leda till jaktmöjligheter i fall man skulle vilja det. Den positiva och signifikanta ålderskorrelationen för både bär- och svampplockning och fiske visar att det är mer troligt att äldre personer ägnar sig åt dessa aktiviteter. Effekten av kön på utnyttjandet av fisk och viltkött antingen från någon inom hushållet eller inte visar att män i större utsträckning jagar och bidrar med kött till hushållet. Utbildning är en annan faktor som påverkar dessa förbrukningsbara resurser och mina resultat visar att lägre utbildning hade en positiv korrelation till jakt och fiske. Inkomst å andra sidan hade ingen direkt påverkan alls på de resurser jag studerat men däremot så påverkar inkomst i vilken utsträckning man äger en sommarstuga vilket i sin tur påverkar alla mina studerade resurser.

## **Introduction**

Forests are more than trees and a study made by Mattsson and Chuanzhong 1993 indicated that the non-timber value accounted for a considerable portion of the total forest value. They also noticed that consumptive use was more important and valuable to rural people than to urban, while non-consumptive use was more important to urban people (Mattsson and Chuanzhong 1993; Stedman and Heberlein 2001). Consumptive activities such as hunting, fishing and gathering wild foods is said to decrease in Sweden today (Rydberg 2001; Pouta et al. 2006) while non-consumptive activities seems to increase (Sievänen et al. 2004). The biggest problem for this decline in use of nature as a recreational resource is said to be the decreasing interest in picking berries and mushrooms and also the decreasing number of hunters in Sweden (Rydberg 2001). Based on the facts mentioned above this study was done to see if consumptive activities actually have lost their interest today and if there is any difference to this decreasing interest between urban and rural areas in Sweden. The study was done in form of a mail surveye that was send out to all municipalities in the northern Sweden and in the county of Stockholm enabling an in-depth investigation of the hypothesis.

Nature has always played an important role as a place for recreation. Picking berries and gathering mushrooms have been a social event and also provided food for the household and even though it most years played a minor role for survival it sometimes made the difference between life and death (Kardell 1980). When the communication network improved in form of railroads in the second half of the 19<sup>th</sup> century the berries actually attained some economical value for people in rural areas since they could ship to and sell the berries at city markets (Kardell 1980; Pettersson 2001). When the export market opened up in the end of the century sugar was more available, new methods of food preservation started to occur and as a result the harvest of berries increased (Kardell 1980). When the rapid urbanization and rising standard of living started, the economical exploitation of berries decreased rapidly and instead become one of the most important sources of recreation in Sweden (Kardell 1980). Swedish forestland covers about 67 percent of the total land area in Sweden (Rydberg 2001) and produces about 1000 million liters of berries and 3600 million liters of mushrooms each year (Kardell 1980). However only a small fraction of the yearly production, about 10 percent is actually harvested (Kardell 1980).

Thirty years ago Kardell 1980 found that berry picking has developed in to one of the major recreational activities in Sweden and that more than 80 percent of adults harvest berries every year. Kardell also found that more than 50 percent also picked mushrooms. The economic value of picking berries and mushrooms are low and instead it is the combination of pleasure and profit that makes this activity an important civil right to a lot of Swedish people (Kardell 1980).

The youth of today is said to be the first urban generation, raised in urban environment without any real natural connection to the rural areas in Sweden. The urban youth is said to be computerized, over weighted, have a high demand for adventuress experiences and have a low

interest in nature. However all of these assumptions have low support by the studies made in the area (Rydberg 2001).

There have been studies made in other countries to investigate what factors might correlate with participation in consumptive use activities. Studies made in Finland by Pouta et al. 2006; Sievänen et al. 2004 shows that berry and mushroom picking is positively associated with higher age and summer cottage access amongst other things. The study by Pouta et al. 2006 showed that the participation was between 10 to 20 % higher amongst rural resident compared to urban residents. Yet summer cottage access increased the participation in towns to almost the same level as for rural residents without summer cottage access and there by reduced the difference in participation between people in urban and rural areas (Pouta et al. 2006; Sievänen et al. 2004). A study made by Sievänen et al. 2004 showed that the highest share of mushroom pickers in the case of education had a university education (50%) years of education also affected the participation in the U.S. positively. However studies by Kangas and Markkanen 2001; Pouta et al. 2006 indicated that berry picking participation is associated with lower education. Kangas and Markkanen 2001 also said that household income and employment status did not have any significant affect on berry picking participation.

For the majority of human history forests most important role has been to produce food. Fishing, hunting for wild animals and collection of edible plant parts was important parts for human survival (Rydberg 2001). While the society becomes more urban oriented the romantic, symbolic and ideal values of the nature becomes more important and the nature oriented values such as hunting, berry and mushroom picking and exercise becomes even less important. (Hörnsten 2000). Hunting is together with fishing our original livelihood and oldest cultural property. Even though hunting today is an interest mostly for recreational purposes, and that there is an sinking tendency on both the amount of active hunters and the amount of younger hunters, the economical value of hunting should not be underestimated, both in the form of meat value and the expenses/profits that is associated with hunting (Rydberg 2001). Many inhabitants of Sweden have hunting and fishing as their most important activity in their life especially in the northern parts and in the mountain region which covers a large geographical area but is sparsely populated (Ericsson et al. 2006). The importance of hunting in those areas is reflected by the fact that every third person hunts (Helle 1995; Rydberg 2001). Later studies shows that this number is quite the same today and somewhere between 30-40 percent of the population in the north of Sweden hunts (Ericsson et al. 2005). In many cases hunting and fishing is the most important reasons to why people stay and live in rural areas (Rydberg 2001; Pouta et al. 2006) Hunting and fishing seems to be an important activity for Swedish households and especially in the most northern counties. In this area it also seems like meat from game and fish is an important part of household economy and food supply (Ericsson et al. 2005). However previous studies have showed that approximately two-thirds of the total hunting value of all game in Sweden refers to recreation and the last third refers to meat (Mattson 1989; Fredman et al. 2008).

Another example of the importance of hunting and fishing in rural areas is found in the study by Neuman 2008 where randomly chosen people living in rural areas close to the northeast coast of Sweden was incorporated in a survey close to the city Umeå. In this study he asked them what role fishing played in their life and he found that 86 percent of those who answered said that fishing had at least a small role in why they still lived in the area. 59 percent even said it played a quite important role to why they still lived there (Neuman 2008). Leisure fishing is an essentially bigger recreational source for Swedish people than hunting and the number of anglers in Sweden is four times more than those who hunt (Fredman et al. 2008).

A study made by Stedman and Heberlein 2001 in the U.S. suggested that the gender aspect on hunting is dramatic. There is 10-20 times higher chance that a male will participate in hunting than a female. However female participation could be really important since their potential increase in hunting participation might offset the decline in hunting participation overall (Heberlein et al. 2008). Females are more likely than males to hunt for meat and to be with friends while males are more likely to hunt for sport or the opportunity to be close to the nature (Duda 2001). In the United States there has been a decline in hunters between 1990 until 2006 and changing demographics suggest that this will continue since the population gets older, increasingly more urban and suburban. Similar patterns are noticeable in at least half of the countries in Europe (Heberlein et al. 2008). In the U.S. the factor that has the highest effect on hunting participation for males is if you have grown up in rural areas. The second biggest effect on hunting participation is age where older people tend to hunt less than younger people. Since less people grow up in rural areas and the population is aging the hunting participation amongst men is declining. One thing that seems to offset this decline is income and male hunters have higher income (Duda et al. 1995). A study made by Heberlein et al. 2002 suggests that on an individual basis hunting is associated with age, gender and income. Where older cohorts should lead to lower participation in hunting and that a male is more likely to participate than a female. The study also mentions that hunting is positively correlated with income but that the food it contributes might be important in areas with lower levels of income. A similar study made by Heberlein et al. 2002 showed that the strongest predictor of hunting participation is the percentage of the population that is classified as rural. Hunting participation also increased with increased amount of forestland. Hunting also increased in states with lower income per capita but mostly because states with lower income had higher percentage of rural population. It also showed that age, gender, unemployment and percentage of forestland do not influence participation in hunting. This shows that hunting is more associated with rural culture than any other factors.

When it comes to fishing in the U.S. it seems to be the same factors amongst men that affect fishing participation and it is also declining because less males grow up in rural areas and that and older men seems to participate less than young ones. Even for fishing it is income that is the biggest offset for fishing participation. Amongst females age, education and urban socialization all seems to decrease the participation in fishing (Duda et al. 1995).

In Finland there is a high participation in recreational fishing and one of the biggest explanations is the tradition of summer cottages and that people spend a lot of their leisure time close to lakes or the sea during summer. All age classes and a high proportion of women were also represented when looking at participation (Salmi et al. 2006). Despite the high participation in recreational fishing it has actually decreased and today the highest participation amongst the Nordic countries is in Norway with 50 % while Finland has 36 % participation and Sweden only 27 % (Salmi et al. 2006).

In Sweden people moving to rural areas from urban areas are often older aged than people moving in the opposite direction (Andersson 2000) and therefore it is possible that older people more commonly live in rural areas and therefore it might be interesting to study the importance of age classes in the participation in consumptive use activities.

The problem with this subject is the lack of knowledge about what factors that correlates with participation and use of consumptive resources and also to what extent. Even harder to determine is what factors that actually determine the participation and use. Previous studies suggest different factors, however still there is a problem determining to what extent they affect and why. If the interest is declining, and thereby the use of consumptive resources, why is this happening? Is it because people are getting more and more urbanized or is it because of other factors that we do not know about?.

My hypothesis in this study is:

1. That there is a difference in consumptive use participation between rural and urban residents

Prediction 1. That age and access to summer cottage will correlate with probability to use berries and mushroom within the household in both rural and urban areas.

Prediction 2. That access to summer cottages, education and sex will correlate with participation in hunting and also in the use of resources from this activity for both rural and urban residents.

Prediction 3. That access to summer cottage, education, sex and age will correlate with participation in fishing and the use of fish meat in the household.

## **Material and methods**

In this study I have used the data from a mail survey about Swedish recreation habits and the use of natural resources in their households conducted by Ericsson et al. 2009. Their questionnaire was sent to 1067 randomly chosen citizens nationwide. Of the national sample 47 % answered the questionnaire. Furthermore a total of 15 317 persons was randomly chosen to get the questionnaire in seven counties. 150 persons in the age of 16-65 years in all municipalities in the counties of Norrbotten, Västerbotten, Jämtland, Västernorrland, Gävleborg, Dalarna and Stockholm were sampled. In the different counties the answering



frequency varied from 45 % in the county of Stockholm to 55 % in Jämtland. To be able to compare respondents from the seven counties they were weighted proportionally in relation to the population in the county. On a municipality level the frequency that responded varied between 31 % and 63 %. In some municipalities in the county of Stockholm the respondent frequency was quite low and this should be taken in consideration when interpreting the responses. What I have done is to analyze the data from the questions of interest to see to what extent people use natural resources in Sweden today. Statistical significance was defined as p less or equal to 0.01 (Ericsson et al. 2010)

**Result**

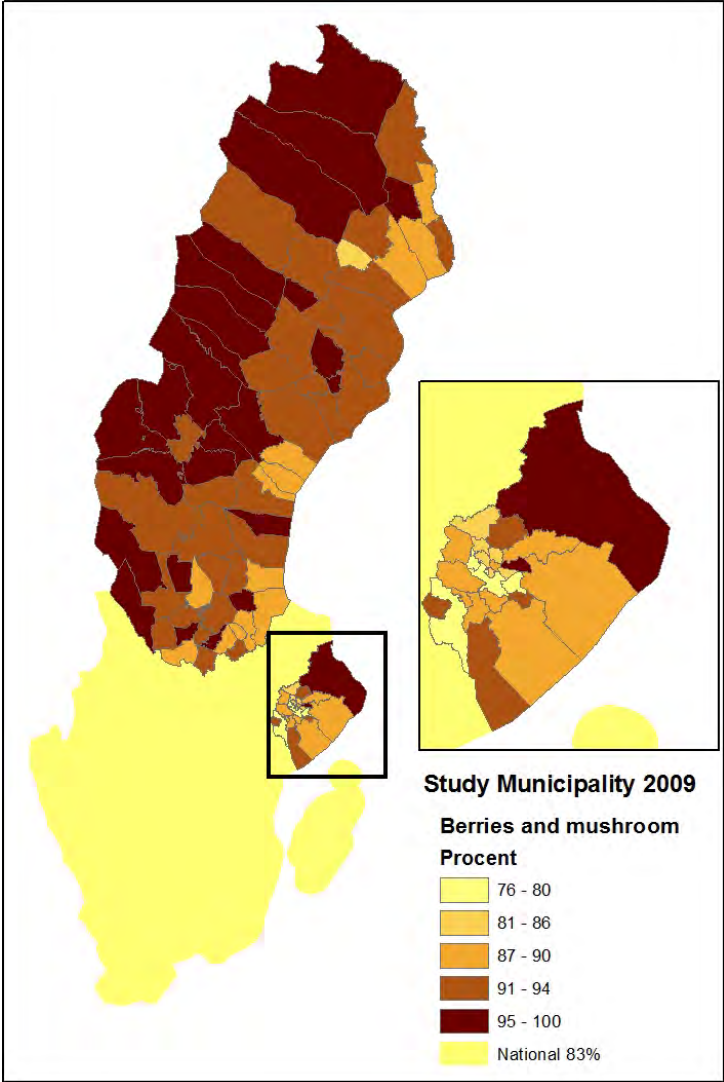


Figure 1. The proportion of Swedes in each municipality and on national level that uses self-picked berries or mushrooms at least once a year.

We can see that the majority seem to use self-picked berries and mushrooms at least at one occasion every year. In the national survey 83 % of the respondents use self-picked berries and mushrooms at least once every year (Figure 3). We can still see that the highest proportion of

berry and mushroom pickers seems to live in the mountain region of Sweden. Still in some municipalities in the county of Stockholm the proportion is as high as in the mountain region. There is a difference in use not only in the north and south gradient but in east and west as well. There is a small but significant difference in use between coastal municipalities and municipalities in the mountain region. All municipalities with the highest probability of using berries and mushroom within the household are rural municipalities in the mountain region of Sweden (Table 1). In the mountain region the municipalities in the table all have 97 % or higher probability which indicates that all or close to all residents aged 16-65 in those areas sometime during a one year period uses self picked berries or mushrooms in their household (Table 1). In the other end there are five municipalities within the county of Stockholm that lies in the lowest level of probability between 76-80 % that I have measured and the rest of them have a higher probability than that to use self picked berries and mushrooms within their household sometime during the year (Table 1). The fact that there is a difference however small between rural and urban areas supports hypothesis 1.

Table 1. Top 11 and bottom 10 municipalities in use of berries and mushrooms.

Top 11 Municipalities	Percentage	Bottom 10 Municipalities	Percentage
Vindeln	100	Stockholm	76
Dorotea	99	Sundbyberg	76
Gagnef	99	Järfälla	77
Krokom	99	Nacka	79
Sorsele	99	Södertälje	80
Vilhelmina	98	Täby	82
Älvdalen	98	Solna	83
Malå	97	Upplands-Väsby	84
Nordanstig	97	Sollentuna	85
Orsa	97	Älvsbyn	85
Åre	97		

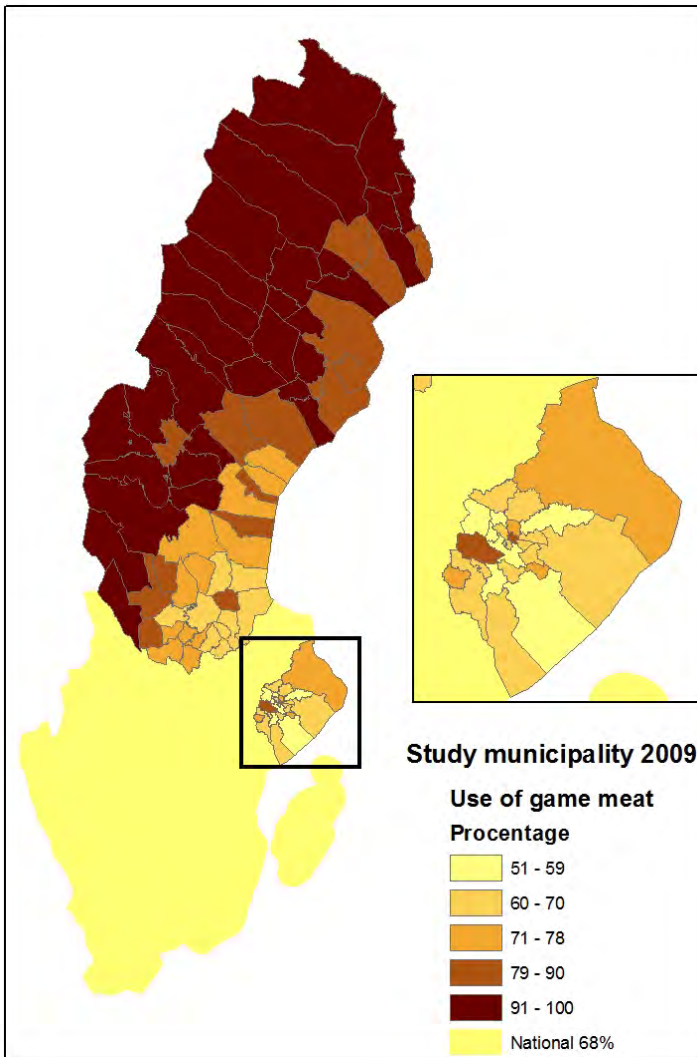


Figure 2. The proportion of Swedes in each municipality and on national level that uses meat from game species at least once a year.

When studying the use of game meat the difference between rural and urban areas is even more significant (Figure 2). Residents from the county of Stockholm has a lot lower probability of using game meat in their household than residents from more rural areas in the mountain region of Sweden. Also the more urban oriented coastal areas have a lower probability to use game meat within their household compared to rural areas further to the west in the mountain region. In the county of Stockholm we can see that municipalities have 78 % or less probability to use game meat within their household during a one year period (Figure 2). There are though two municipalities that have 91 % probability which is as high as for some rural municipalities. Figure 2 also illustrates that 68 % of the respondents on a national level use game meat in their household at least once every year.

Table 2. Top 12 and bottom 12 municipalities in use of game meat.

Top 12 Municipalities	Percentage	Bottom 12 Municipalities	Percentage
Sorsele	100	Botkyrka	51
Dorotea	99	Österåker	51
Pajala	99	Järfälla	53
Storuman	99	Upplands-Väsby	53
Vilhelmina	98	Upplands-Bro	53
Vindeln	98	Haninge	57
Gällivare	97	Stockholm	59
Jokkmokk	97	Sigtuna	61
Kiruna	97	Bollnäs	62
Krokom	97	Hedemora	62
Ragunda	97	Salem	62
Älvsbyn	97	Solna	62

In use of game meat we detect similar pattern as in the use of berries and mushroom (Table 1). Municipalities with the highest probability to use game meat are rural municipalities in the mountain region of Sweden where as the more urban oriented municipalities have the lowest probability. The municipalities in the mountain region that has the highest probability to use game meat at least once every year in their household, all have 97 % probability or higher which means that also for game meat all or almost all residents in those areas uses game meat every year (Table 2). In the county of Stockholm the probability of using game meat in the household is far lower with the lowest probability in Botkyrka and Österåker municipality displaying only 51 % probability to use game meat in the household at least once every year (Table 2).

The fact that there is such a significant difference in probability to use game meat between rural and urban municipalities supports hypothesis 1.

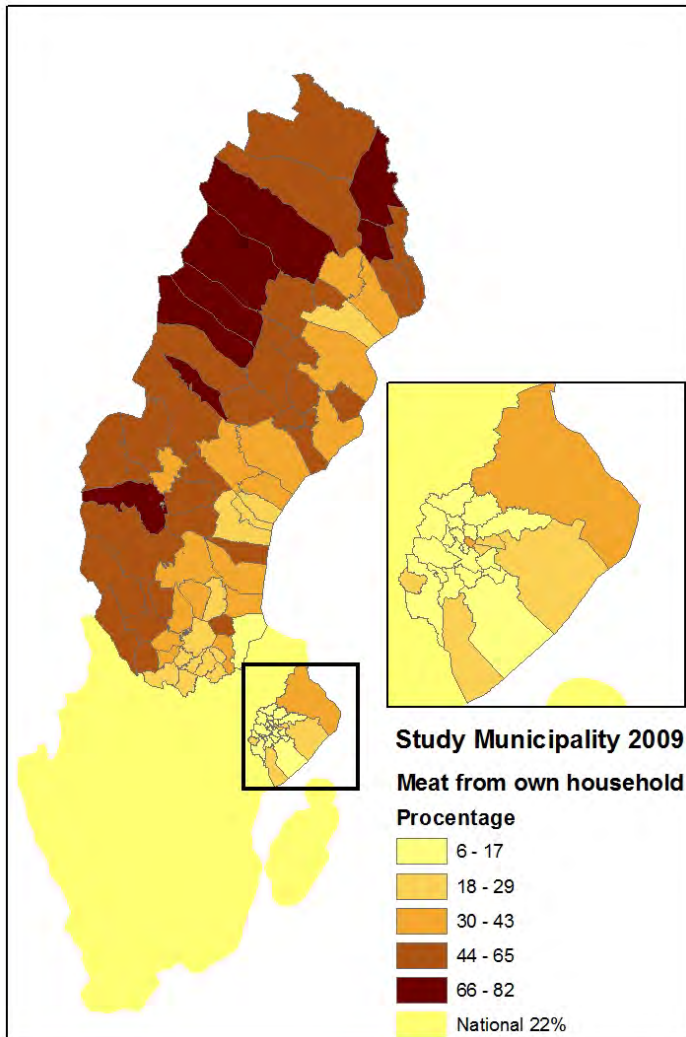


Figure 3. The proportion of Swedes in each municipality and on national level that at least once every year uses game meat that someone within the household has contributed with.

If we look at a household that provides their own game meat the probability decreases dramatically in total and for all municipalities that has been studied (Figure 3). All over the country the distribution has gone down compared to game meat that not necessarily was provided by someone in the own household and the use of game meat provided by someone within the household on a national level is only 22 %. However the same pattern occurs even here and the more rural mountain region has a lot higher probability to use self provided game meat than urban areas such as the county of Stockholm. Also the more urban oriented coastal areas have a low probability using self provided game meat over a one year period. In most municipalities in the county of Stockholm the probability is as low as 6-17 % even though two municipalities have as high probability as 30-43 %. In the mountain region the probability is 44 % or more in most municipalities.

Table 3. Top 11 and bottom 10 municipalities in use of game meat provided by the own household.

Top 11 Municipalities	Percentage	Bottom 10 Municipalities	Percentage
Arjeplog	82	Salem	6
Pajala	80	Sundbyberg	6
Sorsele	78	Solna	7
Överkalix	78	Sollentuna	9
Jokkmokk	74	Nacka	10
Berg	72	Södertälje	10
Dorotea	72	Ekerö	11
Storuman	69	Gävle	11
Arvidsjaur	65	Stockholm	11
Härjedalen	64	Täby	11
Kiruna	64		

We can once again detect that the municipalities with the highest probability are placed in the mountain region of Sweden and the highest is Arjeplog with as high as 82 % probability to use game meat that someone within the household provided (Table 3). This means that four out of five household in the municipality of Arjeplog uses game meat that someone within the household contributed with at least once every year. Two municipalities Salem and Sundbyberg has as low probability as 6 % (Table 3). This means that only about one out of twenty uses game meat that someone within the household provided with at least once every year. This suggests that when studying the use of game meat provided by someone in the own household the difference is enormous between the urban areas in Stockholm county and the rural northern parts of Sweden which supports hypothesis 1.

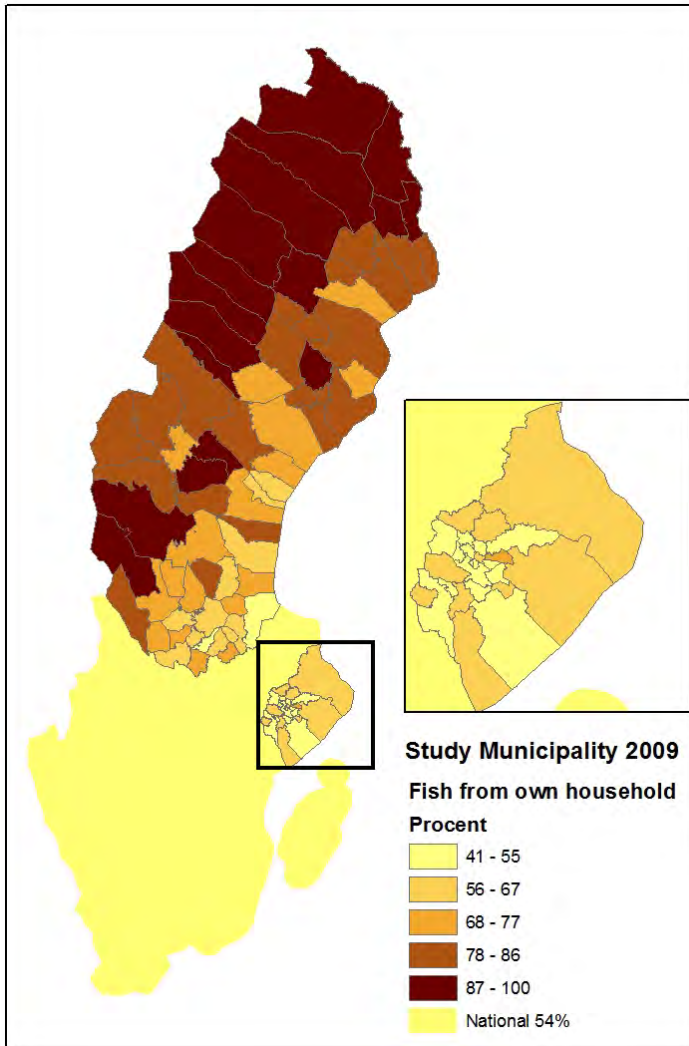


Figure 4. The proportion of Swedes in each municipality and on a national level that at least once every year use meat from wild fish that someone within in the household contributed with.

The probability to use game meat that someone within the household provided only was 22 % on a national level it is a lot higher probability with fish (Figure 3). 54 % of the respondents use meat from fish provided by someone within the household at least once every year (Figure 4). Even with fish we can distinguish a big difference between urban areas and rural areas. There is also a significant difference between the coastal areas and the mountain region (Figure 4.). In the county of Stockholm all except for one municipality have between 41-67 % probability to use fish meat provided by someone within the own household while the same probability in the mountain region is 78-100 % (Figure 4) and this supports hypothesis 1.

Table 4. Top 14 and bottom 14 municipalities in use of fish provided by the own household.

Top 14 municipalities	Percentage	Bottom 14 Municipalities	Percentage
Sorsele	100	Stockholm	41
Arjeplog	96	Salem	42
Kiruna	96	Sundbyberg	43
Jokkmokk	96	Solna	45
Gällivare	95	Haninge	48
Älvdalen	94	Sollentuna	48
Dorotea	93	Gävle	49
Härjedalen	93	Huddinge	49
Bräcke	90	Täby	49
Pajala	90	Nacka	50
Ragunda	90	Järfälla	52
Storuman	90	Lidingö	53
Vilhelmina	90	Södertälje	53
Övertorneå	90	Österåker	53

Municipalities with the highest probability to use fish meat are placed in the mountain region of Sweden (Figure 4; Table 4). In this area the municipalities with the highest probability is between 90-100 % in probability to use fish meat provided by someone within the own household (Table 4). That means that nine out of ten or more in those municipalities uses fish meat that they have provided themselves at least once every year. The same number for the urban oriented municipalities that has the lowest probability is 41-53 % to use fish meat that someone within the own household has provided with (Table 4). This is only four or five out of ten that uses fish meat provided by the own household at least once every year which is about half compared to the highest probability in the mountain region.



Table 5. How different parameters correlate with the use of different consumptive use resources.

	Wild meat	Wild meat from the own household	Fish from the own household	Access to summer cottage	Education	Income	Sex	Age
Berries and mushroom	***.43	***.34	***.40	***.17	-.01	0	.02	***.24
Wild meat		***.75	***.49	***.22	***-.05	.005	***-.06	.01
Wild meat from the own household			***.51	***.16	***-.07	-.01	***-.05	-.01
Fish from the own household				***.21	***-.12	-.02	***-.08	***.07
Access to summer cottage					***.10	***.08	-.03	-.01
Education						***.10	***.13	***-.16
Income							-.02	-.004
Sex								-.03

Note! \*\*\* =  $p < 0.01$

The use of berry and mushroom display a significant positive correlation ( $p < 0.01$ ) to age and access to summer cottage (Table 5) which means that older people and people with summer cottages are more likely to use berries and mushrooms in their household. However education, income and sex do not have any statistically significant correlation to the use of berries and mushrooms (Table 5) which supports prediction 1. When we look at the use of wild meat the parameters that correlate are access to summer cottage, sex and education where access to summer cottage has a positive correlation while sex and education has a negative correlation.

This means that older people with lower education uses game meat in a higher extent than younger with high education. Income and age do not have a significant correlation to the use of game meat (Table 5). Similar results were found for use of wild meat collected by someone in the own household as for wild meat overall this supports prediction 2. In the matter of fish the parameters that has a significant correlation are access to summer cottage, education, sex and age where summer cottage and age has a positive correlation which means that older people tends to fish more than younger people (Table 5). Education and sex on the other hand has a negative correlation to using fish meat provided by someone within the household and that suggests that males with a lower education are more likely to use fish within their household (Table 5). Income is the only one that does not have a significant correlation to using fish meat provided by someone within the household and this supports prediction 3. Access to summer cottages has a positive and significant correlation with education and income which might be expected since you need a higher income to afford a summer cottage and higher education often give you higher income. Education has a positive and significant correlation with access to summer cottage, income, sex and a negative correlation to age (Table 5). This indicates that high education gives a higher income which also gives you a better opportunity to afford a summer cottage. It also indicates that young females are more likely to have a high education.

## **Discussion**

When investigating the use of consumptive resources such as berries and mushroom, game meat and wild fish this study focused on the difference between different municipalities in Sweden and also to what extent it is used over a national level. The results were analyzed to detect any difference between rural and urban municipalities. When looking at the use of self-picked berries and mushrooms in Swedish households (Figure 1). I noticed that the Swedish people overall uses berries and mushrooms quite frequently and 83 % of those who answered on a national level had used berries and/or mushrooms at least once the last year. Result indicates a higher use rate of berries and mushrooms in rural areas such as Vindeln and Dorotea compared to more urban municipalities such as Stockholm and Sundbyberg (Table 1). However, I find it to be quite strange that the proportion of households on a national level has such a high probability of using berries and mushrooms every year. The difference between rural and urban areas was expected to be greater than my results showed. There are several reasonable explanations to the relatively small difference between rural and urban areas. One explanation could be that a lot of people in urban municipalities use mushrooms in their household since mushroom could be seen as exclusive and therefore something nice to give your friends at dinner. This is supported by a result found by Kardell 1980 that Swedes started to use mushrooms as a natural asset and that it was well worth eating first when they started to move in to towns. People living in urban areas today may still believe mushrooms to be exclusive and therefore well worth picking while berries is not worth the effort to the same extent. Urban living people might also have mushroom picking as recreation to a higher extent because they can get something exclusive out of their recreation activity. It might also be that people in rural areas get recreation almost every day in form of walks in the forest and that

they therefore do not pick berries or mushroom in a recreation purpose instead they pick berries for preserving over the winter so that they can use it within their household. The difference between rural and urban areas may have differed more if we would have divided berries and mushrooms in to two separate questions instead of asking about both in the same question. In rural areas it might be that the residents pick more berries since they have easier access to good environment and have a higher tradition of picking and using berries. It is also important to know the high productive places or sites where you can find berries in an amount worth picking (Lindhagen and Hörnsten 2000) which might be difficult for people living in urban areas that do not know these places. A person moving from rural areas to urban areas seems to lose this knowledge and also their cultural bond to their home areas. This seems to be extended in future generations that makes the personal bond to rural areas weaker and weaker (Lindhagen and Hörnsten 2000) this might affect the berry picking tradition amongst urban living people. Today all people want to have their recreation grounds close to home (Rydberg 2001) and therefore it might be difficult to find good forestland with a high productivity of berries and mushroom close to where you live. Another problem is probably that the small parts of forestland that is actually accessible close to where you live are used by a lot of individuals and is not that good in productivity. Therefore the chance of actually finding any berries or mushrooms might be relatively small which is also suggested by Rydberg 2001. While in rural areas there is a lot of forestland and not so many inhabitants everyone might have a lot higher chance of actually finding berries and mushrooms since there is a lot less competition and because they are more likely to know where to look. However, people living in urban areas might originate from a rural area and therefore have a summer cottage where they get access to a lot more forestland with high productive sites in that area and thereby having a higher probability to use berries and mushroom. We might also see patterns indicating a difference between municipalities close to the coast and municipalities in the mountain region (Figure 1). This might be due to that a municipality close to the coast in a higher extent is urban since they historically have been important places close to the water. Yet, when it comes to the use of berries and mushrooms every municipality represented in this study showed a high use rate in there households. Stockholm how has the lowest use in households with 76 % which still is high and not much lower than the national mean. Other explanations might be that the tradition of picking berries and mushrooms and the amount of forestland is higher in the mountain region compared to coastal areas. I believe that the low populated mountain region might also see berries and mushroom as a more important contribution as a food resource for the household. It could be like this since nature is close and can contribute with a lot of different food resources and that it is quiet far to the closest grocery store in an urban area.

### **Game meat**

The use of game meat also seems to be high in Sweden overall and of those who answered 68 % used game meat at least once the last year. In table 2 we can see that the difference between rural and urban municipalities is even more noticeable than for berries and mushroom. Sorsele,

Dorotea and Pajala are using game meat most of all rural municipalities represented in this study. Botkyrka, Österåker and Järfälla are urban municipalities and they have the lowest use of game meat amongst all of the studied municipalities. Looking at the top and bottom 12 in use of game meat it is quite obvious to see that all bottom municipalities are more urban municipalities and most of them belong to the county of Stockholm while the top represented is all rural municipalities with a probable higher need of using natural resources in their household to provide food. A possible explanation might be that they need game meat to provide food since my results suggest that mostly low educated individuals, which might give a lower income, seems to be the ones that hunts and provides their family with game meat. According to table 5 younger people tend to have a higher education than older ones and because the fact that younger people tend to move more to urban areas and older people the opposite way this could be an explanation to why rural people uses game meat in a higher extent than urban.

The proportion of households on a national level who answered that they have used game meat provided by someone within the household is only 22 % (Figure 3). This is probably an indication that a lot of people know someone how hunts since they use game meat but not so many actually hunt the meat themselves. Another possible explanation is that people believes game meat to be very exclusive, and therefore buy game meat from friends or in the supermarket to be able to invite some friends over for an exclusive dinner. When looking at figure 3 and table 3 we see an even higher degree is connected to the rural environment since most of the municipalities with a high proportion that gets meat provided by someone within the own household is located in the mountain region in Sweden. This probably has something to do with the fact that rural areas to a greater extent has the possibility for people to hunt and thereby for people to know someone who hunts and get meat that way. People living in rural areas have a better access to good hunting grounds mostly because the amount of forestland is a lot higher in rural areas but also because the competition about the forestland is smaller since there is less inhabitants to share it with. However there is a very large part of the inhabitants that do hunt in those regions so they will have to get along and share hunting ground in hunting teams. A second explanation according to Heberlein et al. 2002, probably the most important one, is the fact of socialization and the rural culture of hunting, which means that if you are born in a rural area you are more likely to begin to hunt. This is much likely because your parents in some form are likely to conduct some of these activities on a yearly basis. If you have parents who hunt you have an entrees point through them to begin hunting yourself which is not as common in urban areas. If your parents do not hunt the probability of having a friend or knowing someone who hunts is greater in rural areas, this mostly because the culture for hunting in rural areas is very strong. This is supported by Heberlein et al. 2002 who found that you could ask people three questions and if they answer yes on all of them it was most likely a hunter. The questions where are you a male, do your father hunt, and did you grow up in a rural area? This is questions that according to the study made by Heberlein et al. 2002 can tell you if a person hunts or not. This supports the theory that you learn to hunt, fish and pick

berries and mushrooms if you grow up in a rural area and maybe not so much in urban areas. The fact of forestland having an important role in why people hunt and use game meat is also supported by the study made by Heberlein et al. 2002 where they studied the most important factors to why people in USA and Europe hunt and the amount of forestland was one of them. The low proportion of households that actually uses game meat that someone within the household contributed with compared to the quite high amount of household that uses game meat at all could have its explanation in the fact that according to Rydberg 2001 you can see a sinking tendency over the last couple of years in the amount of active hunters and also the amount of younger hunters. This will of course affect the number of household that can say that someone within their household is a hunter and therefore also the amount of households that provides themselves with game meat. However the possibility to use game meat in your household even though no one within it hunts themselves will of course be affected but not in such a high extent since game meat will always be possible to buy in stores and to get from family or friends that do hunt themselves.

### **Wild fish**

Fishing is as mentioned in the introduction a very big leisure time activity for a lot of people in Sweden and therefore you could believe that there should be a high participation in recreational fishing in Sweden. However, a study by Salmi et al. 2006 shows that the participation in Sweden is only 27 % but anyway there is a lot higher proportion of the Swedish household that used meat from fish provided by someone within the household 54 % on a national level used fish provided by someone in the own household. This might be an indication that fish is still to a high extent used as a food resource. However results contributed by the “Fjällmistra” (A research program that concerned the area of 15 mountain municipalities. “The aim was to provide a scientific basis for an efficient adjustment of different usage of natural assets, to each other as well as the environment” Anon 2011) project and a report by Ericsson et al. 2005 suggests that a high proportion of the fishermen in Sweden today is sport fisherman and that the actual fishing experience is more important than the meat. This is actually a probable outcome since Salmi et al. mentions 27 % of the individuals in Sweden and my results is per household and the chance that someone of those 27 % lives within some household is quite big. In a lot of household there is probably more than one individual in the household which might give as high numbers as 54 % of the household that uses fish provided by someone within the household but it can also only be 27 % of the population that actually do fish but a lot of people live within the same household. Because of this it is not strange at all if a high proportion of the fishermen actually are sport fishermen and do not provide fish to their household. If they would have provided their household with fish on a yearly basis my results might have increased even further. Also when it comes to the use of fish there is a significant difference between rural areas in the north of Sweden and the urban areas close to the coast and in the county of Stockholm. This might be supported by the fact that most fishermen originates from rural areas (Salmi et al. 2006) and therefore keeps the tradition of fishing going from generation to generation. The difference between coastal areas and the mountain region might

have something to do with the fact that fishing in rivers and in coastal areas has the highest frequency of fishermen in Sweden (Fredman et al. 2008). However there might be a difference in the way of fishing in rivers compared to coastal areas. In rivers it might mostly be done by people with fishing rod with a high proportion of fisherman that actually bring the fish home with them. Coastal fishing on the other hand might mostly be done with big fishing boats as commercial fishing which not really provides any fish to their own household. People in the mountain region of Sweden have a higher access to good fishing waters which might be a possible explanation for the fact that more households in the mountain region use fish in their household. The result from all of the analyses of the use of consumptive resources that I have done shows a difference between rural and urban areas which supports hypothesis 1.

### **Correlating factors**

Factors that affect the probability of picking berries or mushrooms are the access to a summer cottage and age (Table 5) which supports prediction 1. As mentioned in the introduction people living in rural areas tend to be older since young people tend to move to more urban areas and older people tend to move in the opposite direction. Also the fact that you might have more spare time when you get older, since you are not in the middle of establishing a family and building your career, could affect the participation in berry and mushroom picking. Another age factor might be that you have established routine in where to find berries and mushrooms. The fact of having access to a summer cottage is important since it gives you a more continuous life in rural areas and therefore higher access to forestland and good habitats for berries and mushrooms. In my study I have not divided berries and mushroom in the mail survey but in a study made by Sievänen et al. 2004 their results showed that education and knowledge is important factors when picking mushroom. The most important knowledge might be that you have to be able to see the difference between edible mushrooms and those not edible. You also need to know where to find ecosystems rich in mushroom. Another important knowledge that they discuss is the fact of actually going out in the forest picking mushrooms and then finding your way back home (Sievänen et al. 2004). This is probably a factor that could be important to distinguish in future studies and therefore separate berries from mushrooms in a future surveys.

A study in Finland made by Pouta et al. 2006 showed that the ones having the highest probability of participating in berry picking was females in the age between 60-74 that lived in rural areas and had an access to summer cottage (86.6 %). The second highest participation had females within the same group but without any access to summer cottage (81.9 %) and the third biggest group were females in the age of 60-74 years that had access to summer cottage (77.3 %). This shows the same thing that my study has showed that living in rural areas has a large impact on the participation in berry picking since even without a summer cottage rural residence has a higher probability to participate than urban residence with access to summer cottage. Yet the results in the Finnish study also shows the importance of having access to a summer cottage since people living in urban areas that have access to a summer cottage is not

far behind in probability to participate. My results indicate this to but it is impossible to know for sure while looking at my results. To determine if this is the case in Sweden you would have to look in to more specific details on individuals such as age-class, where they live, sex and if they have access to summer cottage. They could also determine that age had an impact and that older people were more likely to participate in berry picking and in my study you can see a correlation with age that suggests that it is the same in Sweden. The only thing that they found that I have not seen in my studies is that females are more likely to participate than males. This might be true and the only difference is that it have not been so clear in my study or another possibility is that it does not have a great impact on participation but however some kind of impact. My results could also be affected by the fact that I have not divided mushrooms from berries and if you make a new study and separate these in to two different questions maybe berry picking in Sweden also would correlate with being a female.

Factors that correlates with using game meat both provided from someone within the household or not are access to summer cottage, education and sex (Table 5) which supports prediction 2. When it comes to summer cottage it probably is the same reason why you use more meat as why you use more berries and mushrooms. You have a more continuous life in rural areas and therefore might be able to hunt yourself or know some who hunts in the area and in that way get hold of game meat. This fact depends upon if you look in to the group of people who uses game meat provided by someone in the household or if they only uses game meat anyway. The access to summer cottage is an important factor in both cases but the difference is if it gives you possibilities to hunt yourself in the area or if you know someone how does and you can get meat that way. You could believe that the fact of education having an important role should be because you need to have knowledge in game behavior, habitat and how to actually hunt game without destroying the population. It is important to hunt game using the information available considering bag limits to get a sustainable population. However that is not the kind of education people have been asked to mention and therefore does not really affect the education correlation to hunting but it is still worth mentioning. A more correct way to look at the education part could be, as mentioned earlier, that there is a sinking tendency in the amount of young people who become hunters. It is shown in table 5 that age and education has a significant correlation to each other and the negative number indicates that younger people have a higher education than older people which is not strange at all since education today is more important than it was earlier. This will explain why educations correlation to hunting has an important role according to my results and why more people with low education uses game meat at home. Education also has a positive correlation to income so with higher education you get a higher income and that could also be an explanation why education affects the use of game meat. Maybe people with lower education have lower income and therefore are more in need of providing their household with game meat as an extra food resource, especially those households that are provided with game meat by someone within their own household. The sex factor could probably have a lot to do with the fact that hunting and fishing historically always have been seen as a manlier task. Another reason is that

you can ask a person three questions to see if he is a hunter or not and one of them was the question are you a male? Also the results in a study made by Rydberg 2001 showed that it is mostly males who hunt and that more than 90 % of the hunters in Sweden are males.

When it comes to using meat from fish provided by someone in the own household it is that access to summer cottage, education, sex and age are all factors that correlates with the probability of using meat from fish (Table 5) which supports prediction 3. Even in this case the access to summer cottage is important since it gives the opportunity to spend more time in rural areas and thereby have access to good fishing waters. You need good knowledge to become a successful fisherman. You also need to know where to fish, what kind of habitat they use and how they behave. Another important part of the knowledge might be to know what gear to use in different situations. Without this knowledge it is quite hard to catch any fish at all. However my results indicate that fishing correlates with lower education which does not mean that you cannot have a good knowledge about the fish (Table 5). People who fish a lot learn those important things about the fish as long as they live and therefore that has nothing to do with the level of education. Also for people with lower education might have lower income and therefore fish is an important food resource in their household since it is almost free. Fishing might depend upon sex in the same way as hunting and if you are born in rural areas, if you are a male and if your father fishes it is probably a higher chance that you also will fish based on the assumptions of Heberlein et al. 2002. Males and especially younger male might like fishing for the excitement of not knowing when a fish will bite and for the feeling of beating the fish in its own backyard. You have learned everything about a species and bought the necessary gear and put a lot of effort in to catching an individual of that specific species. The feeling of success is probably a very satisfying feeling for the fisherman. This might of course mostly appear for sport fisherman and they do not even bring any meat home. Maybe you are more about bringing home fish to your household as food if you are older and more used to that fish is an important food resource for survival or at least to make the food resource better within the household. Further explanations to the age factor in fishing might be interesting to study further since it is hard to establish any real evidence for why this affects the use of fish meat provided by someone within the household.

Something that might be interesting to study in the future could be to investigate if urban people actually use more mushroom and why? Also to conduct a study where you separate berries from mushroom to see if there will occur any different patterns between urban and rural areas. Another interesting thing to study might be what factors that influence the use of consumptive resources and not only what factors that correlates but to actually try to determine the value of each of the ones I have studied and maybe some other ones as well. Something that also might be interesting to study further is how many do fish in Sweden? And how many of them are sport fisherman and how many do actually provide food to their household. There are studies in this area; however deeper analyses and focus on this small area to distinguish the importance of fish in the household are probably needed.



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