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THE INFLUENCE OF HARVESTING OF NON-WOOD FOREST PRODUCTS ON THE ECONOMIC SITUATION OF HOUSEHOLDS IN POLAND

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ABSTRACT

Questionnaire research conducted all over Poland has shown that the harvesting of non-wood forest products helps to improve the living standards of poor families. In 2004, in the households under research, income from the sale of these products amounted to about 27% in summer season and nearly 18% per year of the total income of these families. The income from non-wood forest products was used mainly to buy food. The most frequently harvested products were mushrooms and forest fruit, followed by fuel, decorative branches and medicinal herbs.

Key words: non wood forest products, households, influence of harvesting on living standards.

INTRODUCTION AND AIM

Since time immemorial, forest has created for human beings a possibility of survival by means of supplying protection, fuel and food. This is still true today: even though the role of forest has now acquired many more aspects and the way of understanding its functions has extended, the traditional connection between man and forest still has great importance. In Poland, where the present research has been conducted, there also are regions with traditional, strong connections between the community and forest as well as communities for which non-wood forest products (NWFP) are economically significant.

The aim of the present research was to determine the size of NWFP harvest performed by families which share a household, the differentiation of the assortment and use of these products as well as their economic significance. In accordance with the superior aim of this project, the research focused on those communities and families which have connections with forest and which can harvest NWFP.

MATERIALS AND METHODS

The research was conducted during the autumn 2004 and winter 2004/2005. In the whole area of Poland, 50 surveyors distributed 600 questionnaires (a copy is enclosed) and received replies from 442 families (73.7%). The number of persons in all families under research was 1892 altogether. The survey consisted of 30 questions, some of which were tables to fill in. All questions directly concerning the analysed issues had a closed character [5]. Some of the families filled in the questionnaires only in part, leaving certain questions unanswered. This was the case of e.g. those families which, as it turned out, do not harvest NWFP. The following number of replies was received for each question: 1-442, 2-440, 3-440, 4-442, 5-437, 6-440, 7-436, 8-427, 9-435, 10-376, 11-376, 12-378, 13-79, 14-122, 15-284, 16-317, 17-66, 18-191, 19-165, 20-165, 21-199, 22-414, 23-380, 24-404, 25-251, 26-299, 27-88, 28-209, 29-422, 30-378. All or almost all respondents answered questions from 1 to 9, 22, 24 and 29. The results, in the form of mean values characterizing the analysed population, are presented in diagrams below. In the analysis of each survey question, the number of obtained replies served as the adopted reference level (100%). The mean values referring to species structure or amount of harvested products and influence of harvest on living standards was therefore calculated with relation to the number of households which collect NWFP. In some questions, the respondents could choose more than one answer; in such cases the sum of shares of groups exceeds 100%.

The final stage of research consisted in determining the strength of the relation between the size of NWFP harvest (kg/household) and the income from its sale, by calculating the correlation coefficient. Analysis of the relation between the living standards of families and the estimation of the influence of harvesting on these standards was performed using the non-parametric χ^2 test in its application to contingency tables [3].

RESULTS

In 59% of households under survey, a man was the family head; in 41% it was a woman. Most of these persons (69.3%) were aged 31-60 years; about 13.9% were older and 16.8% were younger (Fig. 1).

Fig. 1. Age of head of family

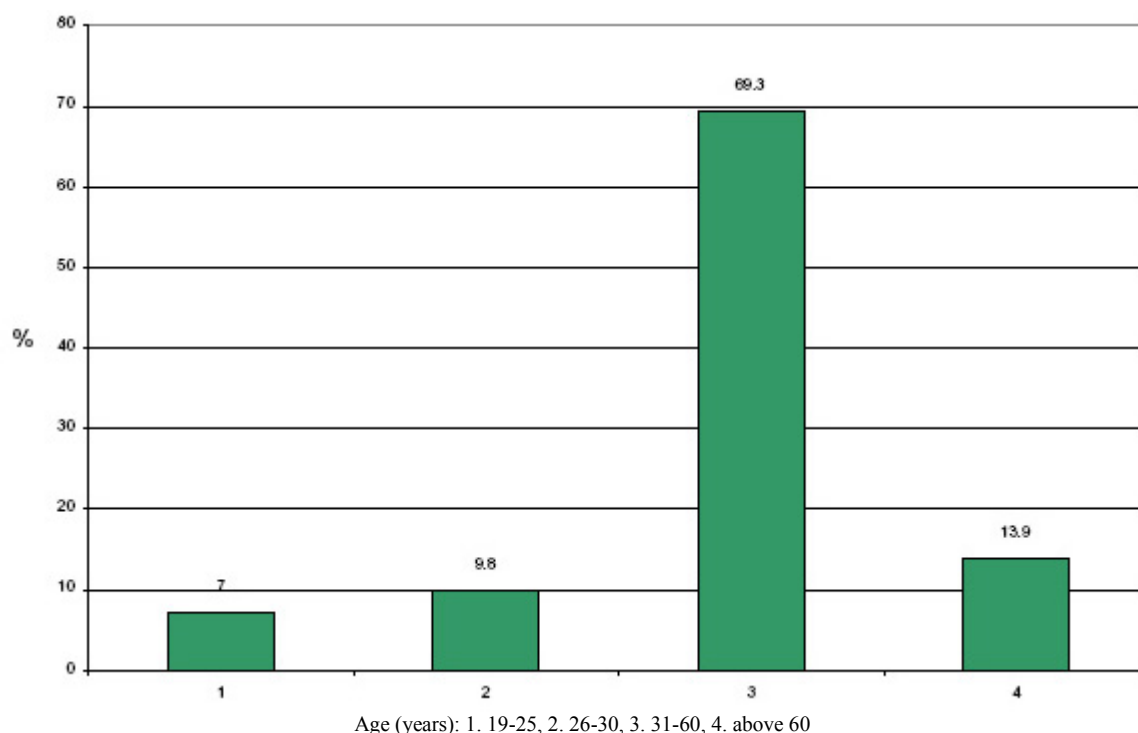
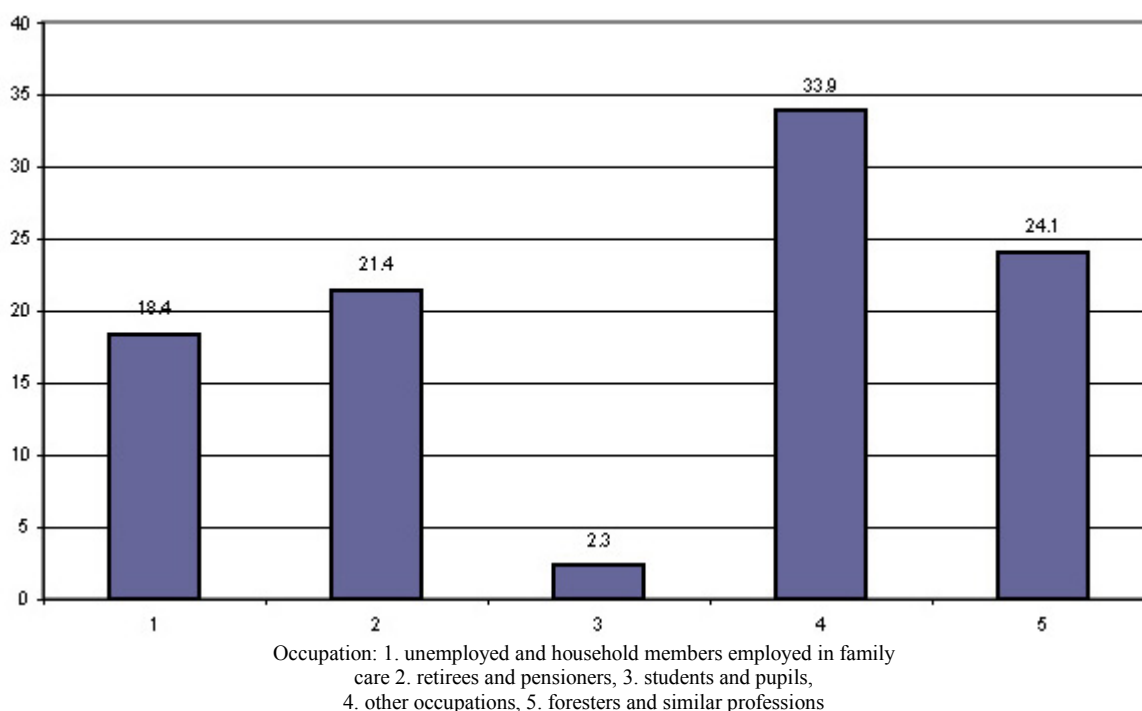


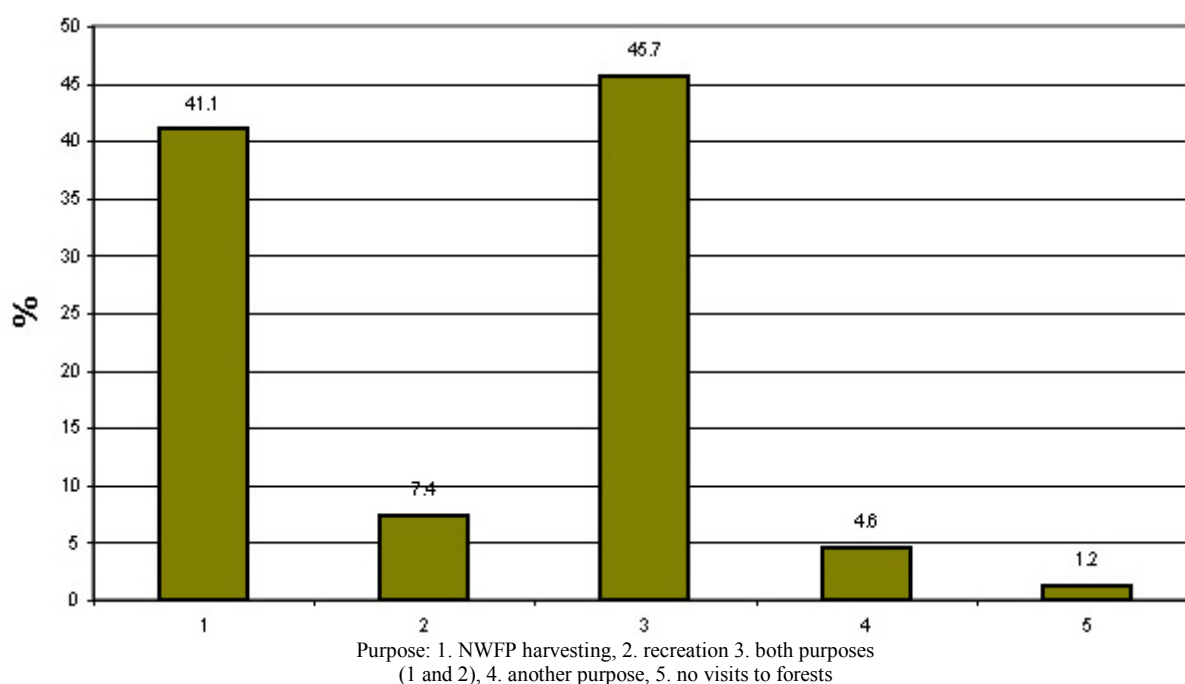
Fig. 2. Occupation of head of family



About 33.9% of persons declared to be family heads were employed in the group of “other occupations”, 24.1% worked as foresters or in similar professions (gardener, farmer), 21.4% were retirees or pensioners, 18.4% were unemployed or employed in family care and 2.3% were students or pupils (Fig. 2). Only 20.8% of them described themselves as single (unmarried, widowed, divorced).

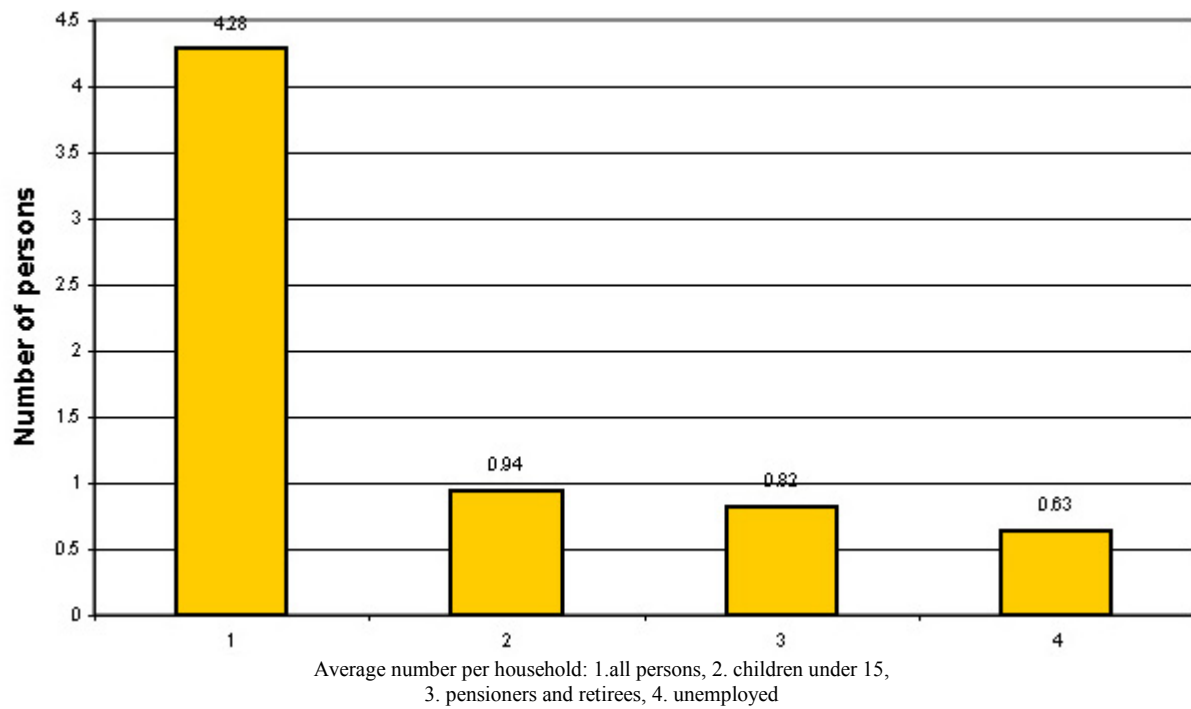
The surveyed households mostly showed (378 surveys, i.e. 86.8% of all respondents) that the purpose of their visits to forest was to harvest NWFP or both to harvest NWFP and relax; only 1.2% of families have not visited forest for several years (Fig. 3).

Fig. 3. Purpose of visits to forest



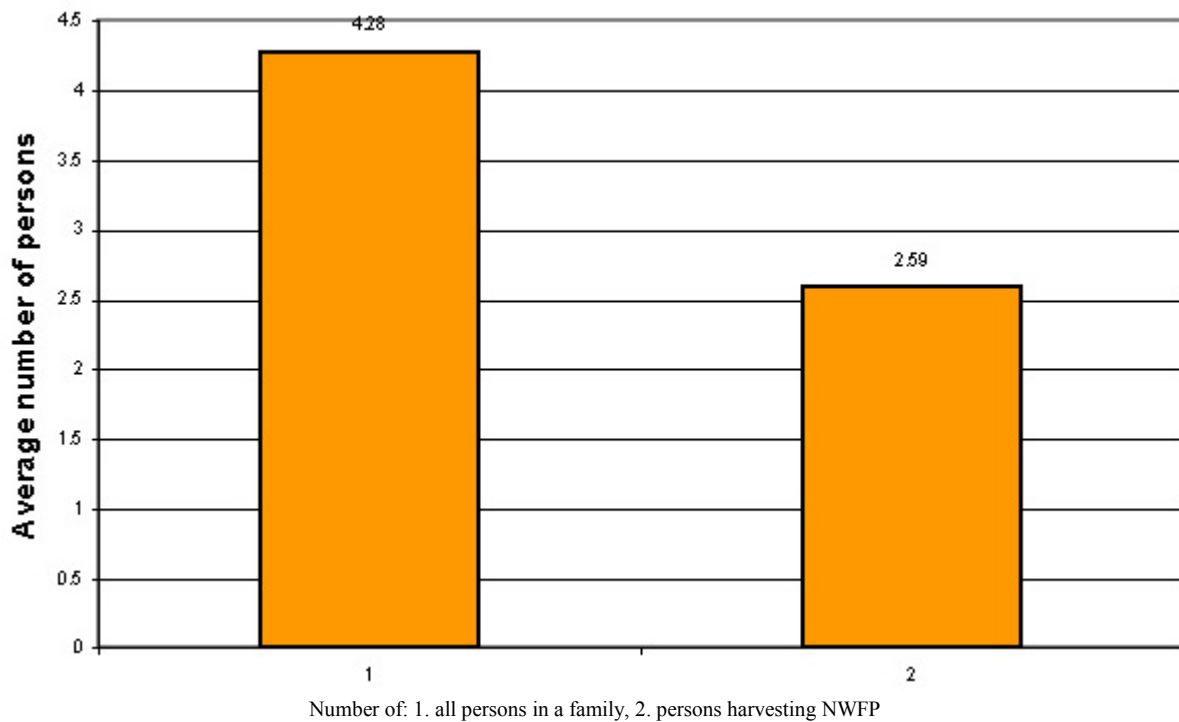
The average size of a family which harvest NWFP was 4.28 persons, including 0.94 of children under 15, 0.82 of retirees and pensioners, and 0.63 of unemployed persons (Fig. 4).

Fig. 4. Family structure



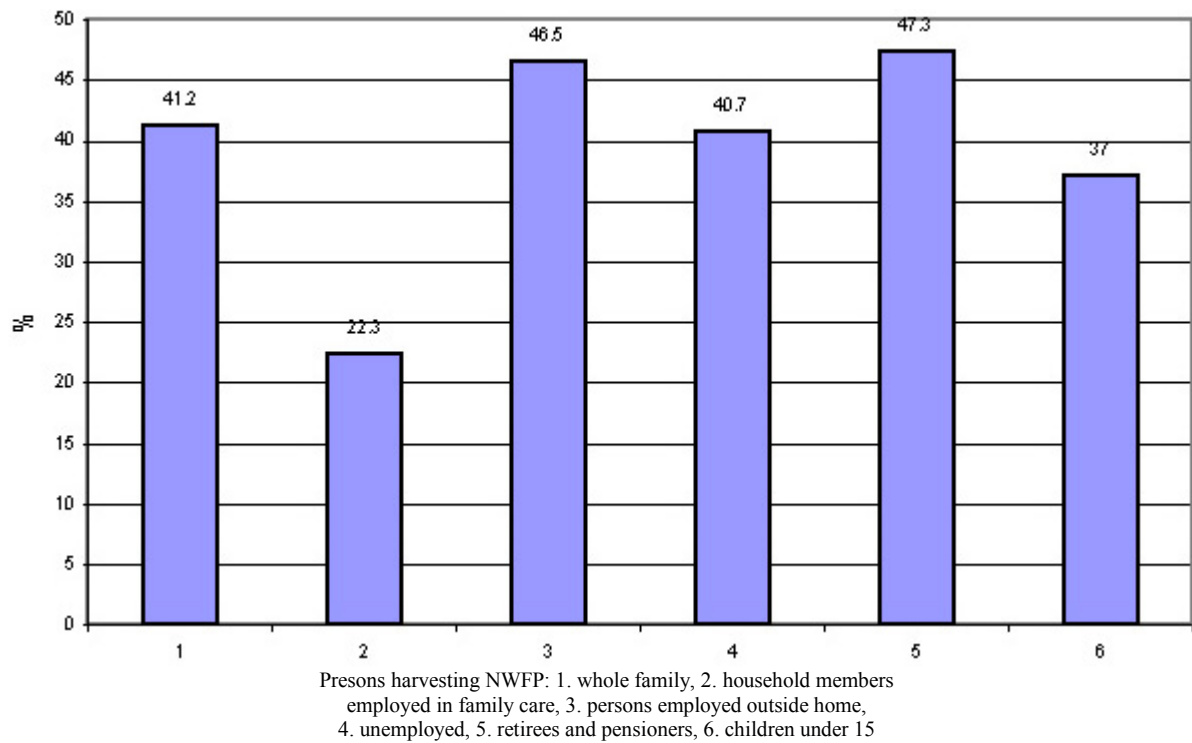
The largest family under survey had 15 members, the second largest had 8 members, followed by two families of 5 members each. With relation to the average number of family members, given above, on average 2.59 persons (60.5% of the number of family members) take part in NWFP harvesting ([Fig. 5](#)).

Fig. 5. Number of persons who harvest NWFP as compared to number of all persons in a family



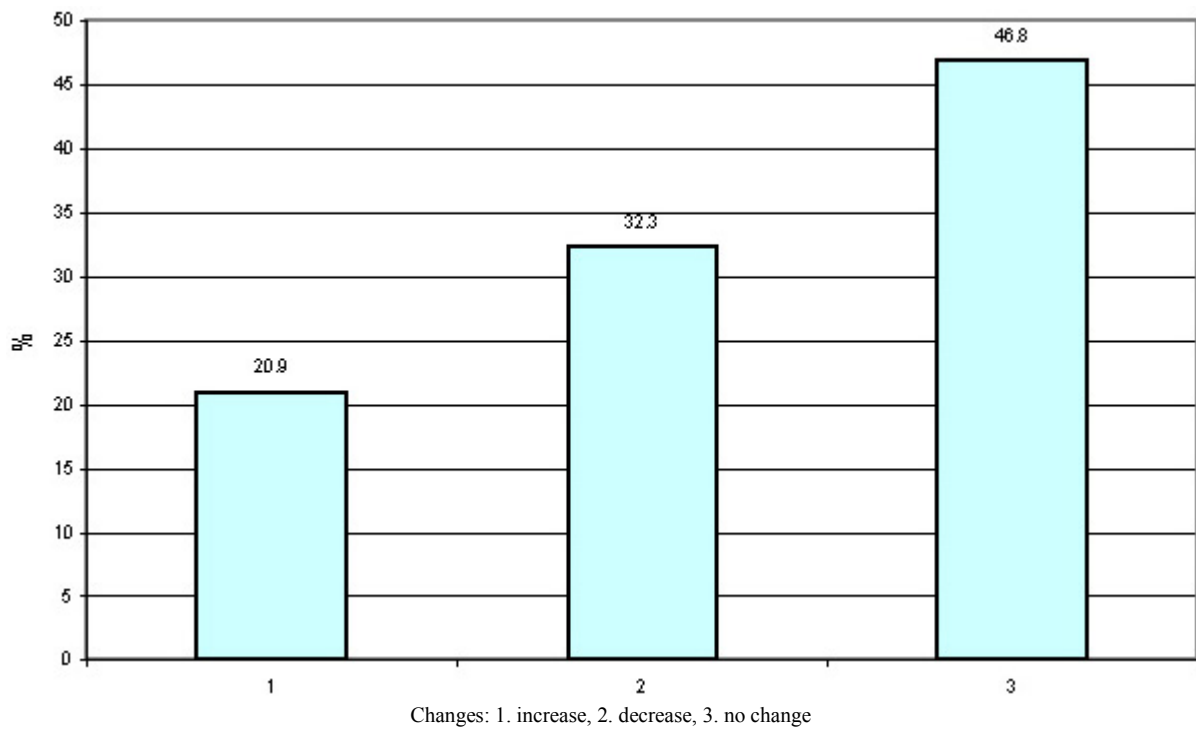
Those who harvest NWFP are mainly retirees and pensioners (in 47.3% of households) or working persons (in 46.5% of households) ([Fig. 6](#)). A relatively large number of respondents also wrote that the unemployed, whole families or children take part in harvesting (in this question, the respondents could choose more than one answer – that is why the sum of shares of groups exceeds 100%).

Fig. 6. Structure of persons who harvest NWFP in a household



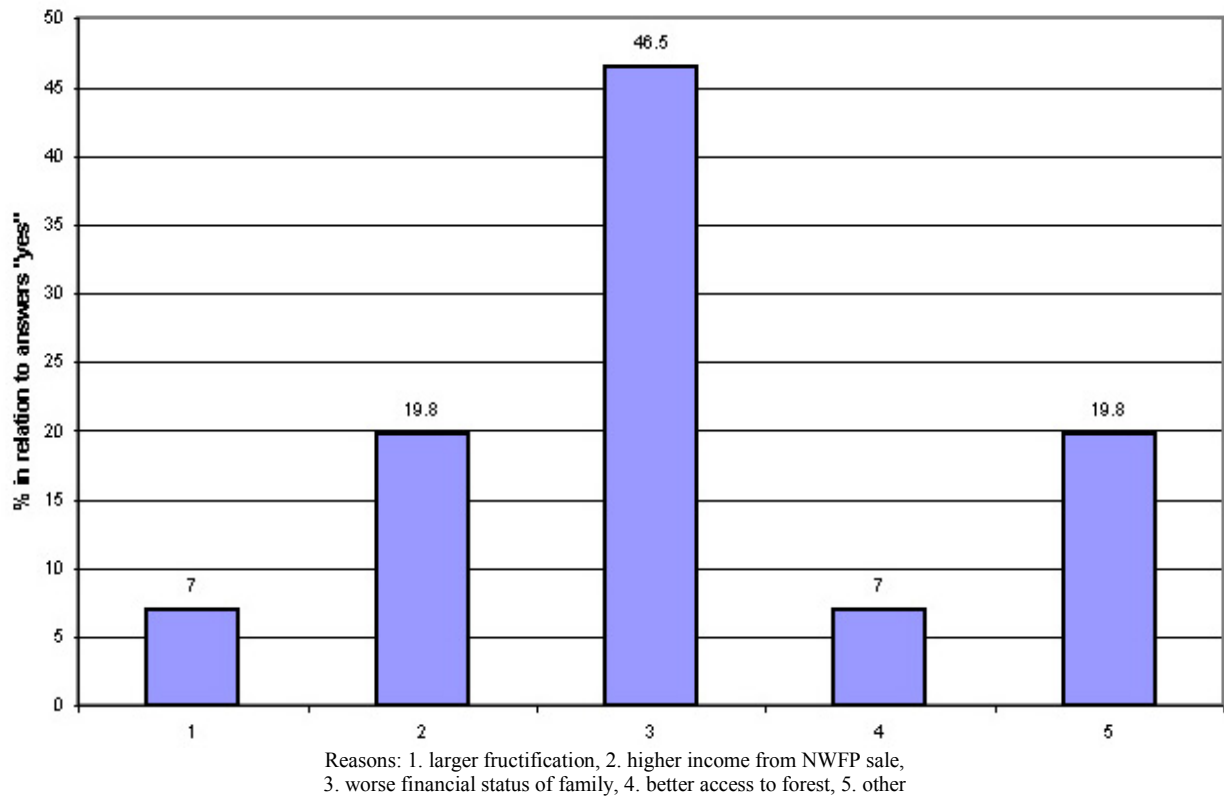
Most households (46.8%) report that during the last 10 years the size of harvest has not changed (Fig. 7). Only 1/5 think that its size is increasing and about 1/3 say that it is decreasing.

Fig. 7. Changes in harvest size



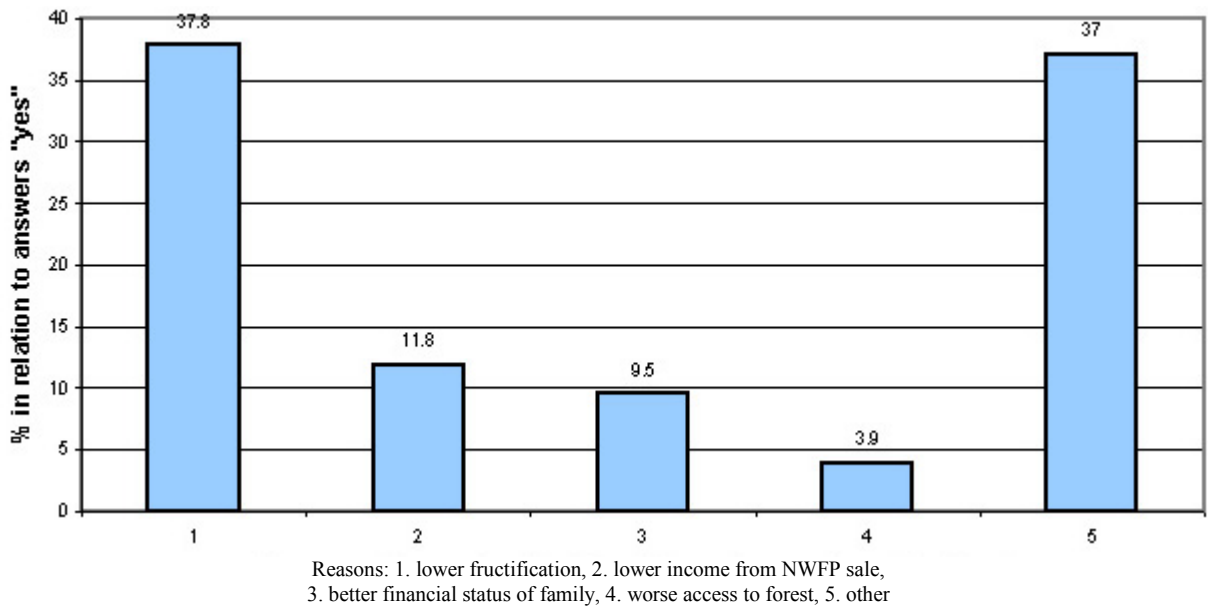
The group which reports harvest increase, gives the reason of deteriorating family financial status (nearly half of the replies) while about 1/5 of respondents explain it by a better income from NWFP sale (Fig. 8). Few families connect harvest increase with larger fructification or with better transport to forest.

Fig. 8. Reasons for harvest increase



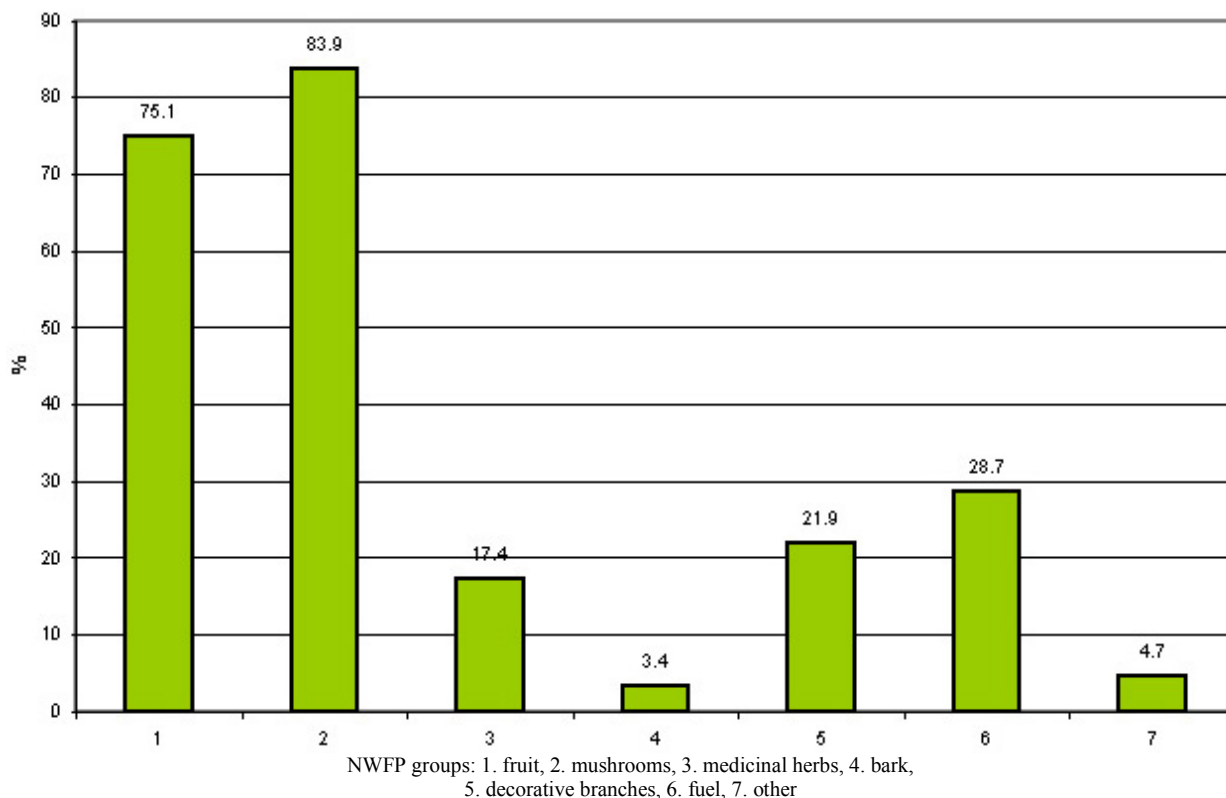
Families which note harvest decrease explain it (in equal proportions, i.e. nearly 40% for each reason) by smaller fructification and by “other” factors, which they sometimes specify as old age or illness (Fig. 9). Fewest families connect smaller harvest with an improvement in their financial status or with difficulties in access to forest.

Fig. 9. Reasons of harvest decrease



Households which harvest NWFP mostly collect mushrooms (over 80% of questionnaires) and then fruit (about 75%). Other significant products are: fuel (nearly 30%), decorative branches and medicinal herbs. The harvesting of bark was noted locally, for export purposes, as package for cheese (Fig. 10).

Fig. 10. Harvesting structure according to groups of NWFP



The percentage is different with respect to harvest size per household and per one family member (Fig. 11 and 12). The highest values (in kg/household or in kg/family member in summer 2004) occurred for fruit and, next, for mushrooms and herbs. The maximum value reported in one of the households for fruit harvest was 2560 kg. The maximum harvest of mushrooms was 960 kg and of herbs – 250 kg. The total amount received by adding the data from all surveys was 41,452 kg fruit and 29,425 kg of mushrooms.

Fig. 11. Average harvest size in households which collect NWFP (kg/household)

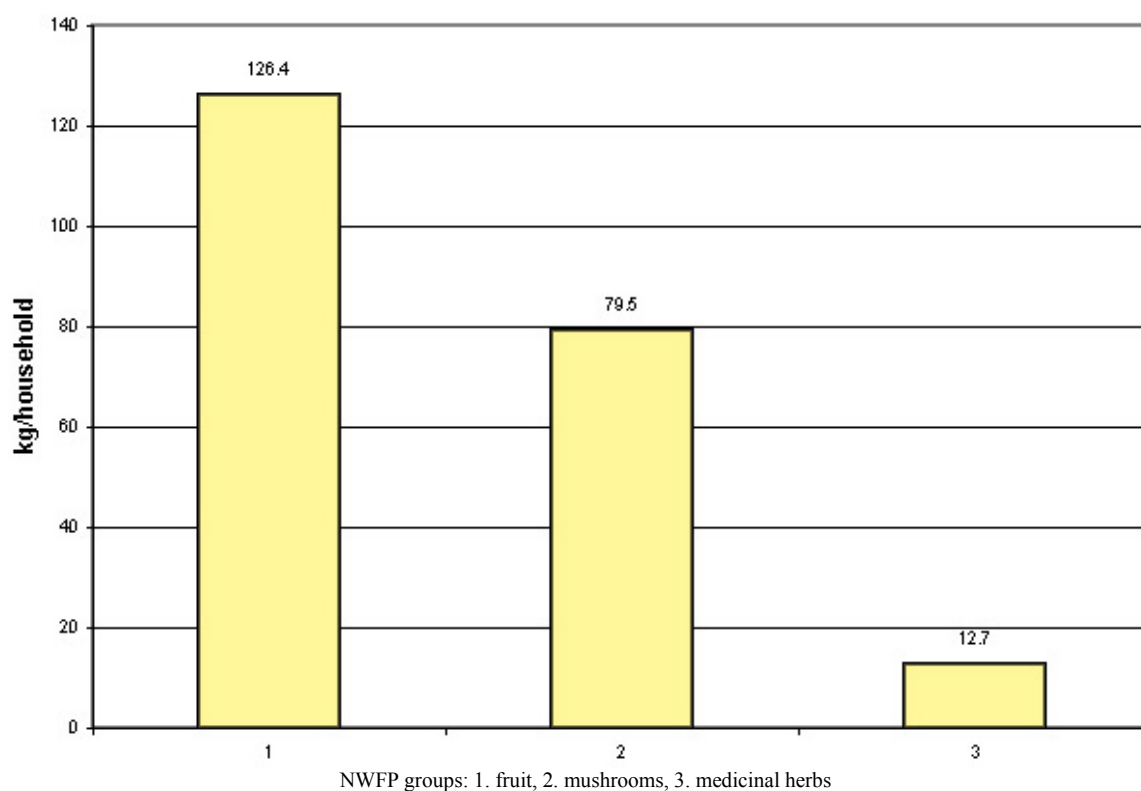
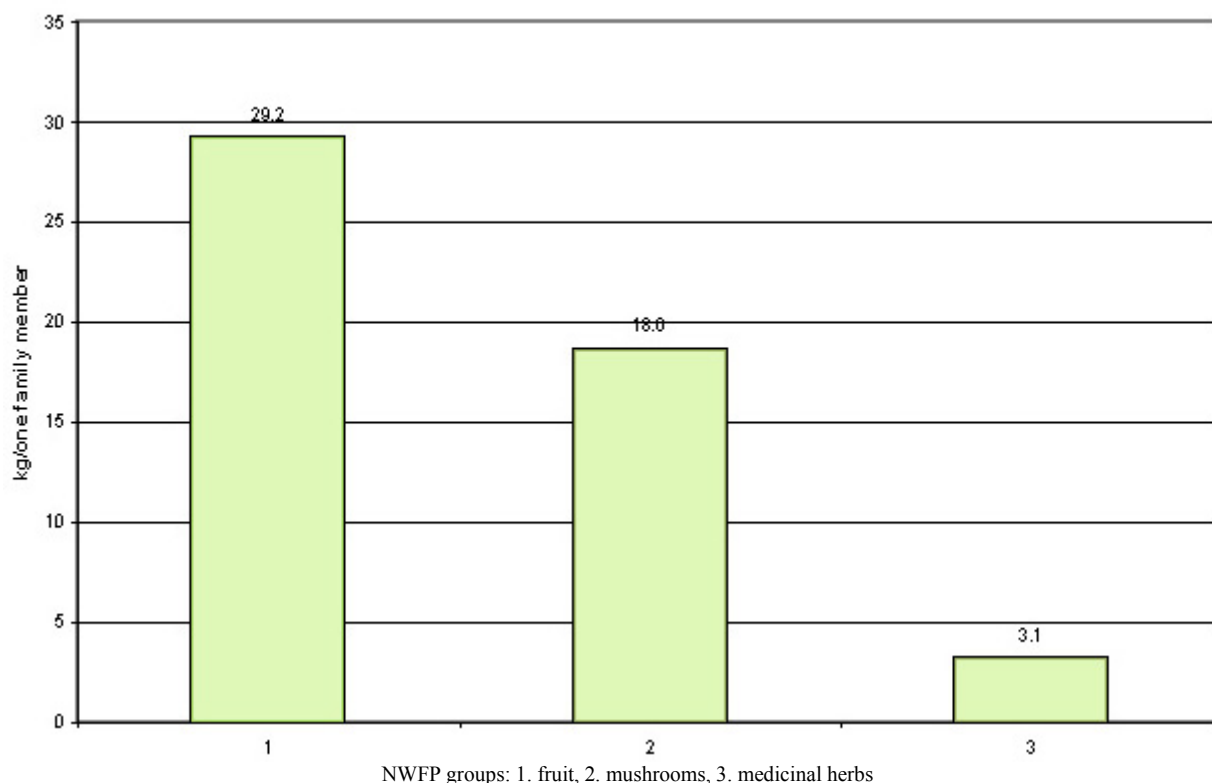
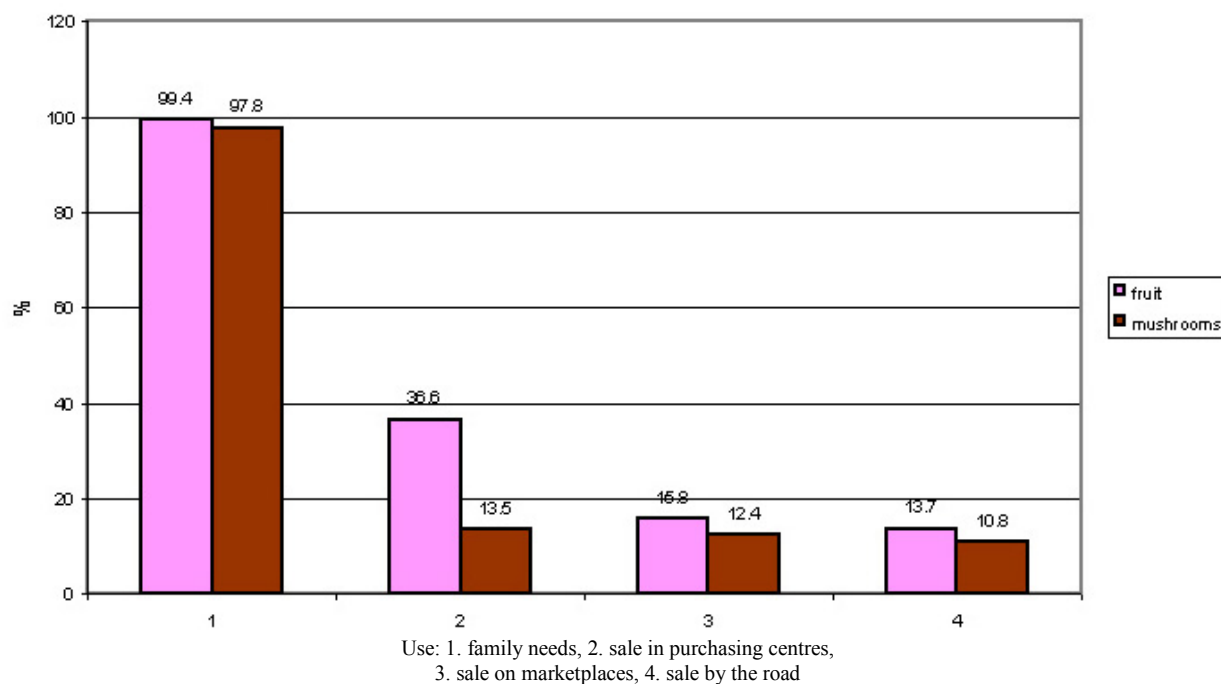


Fig. 12. Average harvest size in households which collect NWFP (kg/one family member)



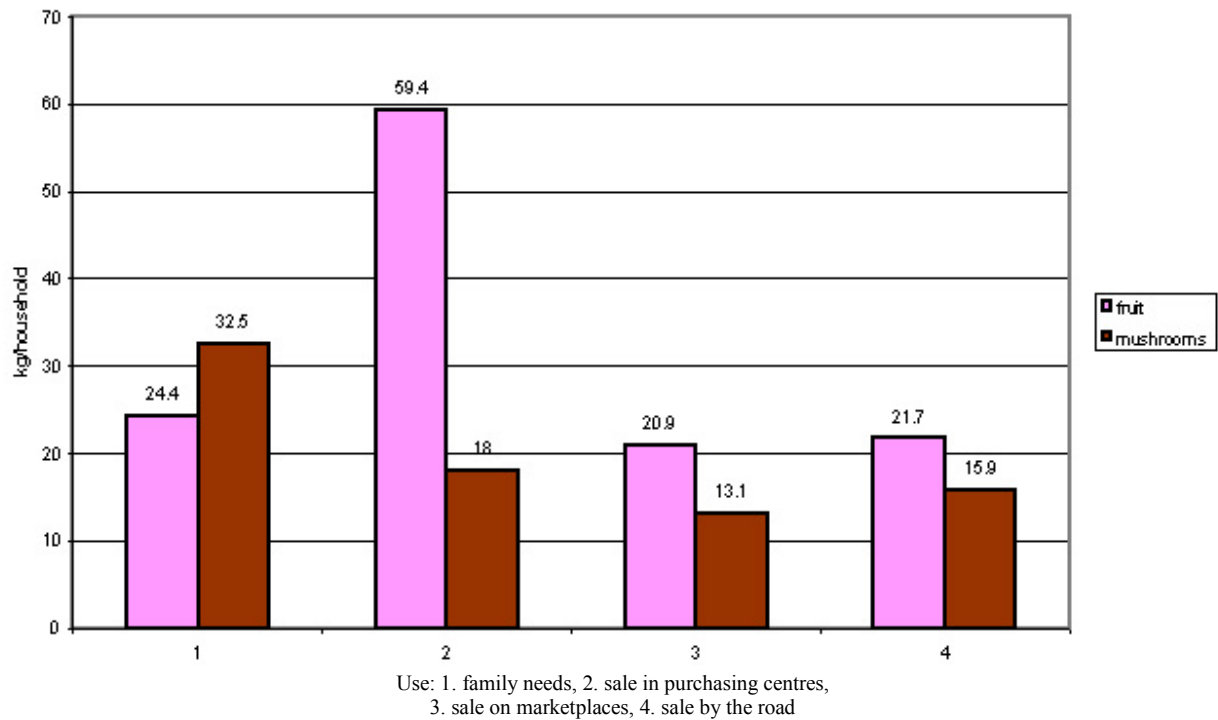
Fruit and mushrooms were mostly harvested for households' own needs (nearly 100% responses in the group of families which harvest NWFP) and only rarely sold, usually in purchasing centres, more seldom – at marketplaces and the most rarely – by the road (Fig. 13). Some households used various forms of sale.

Fig. 13. Use of harvested fruit and mushrooms structure in % of households



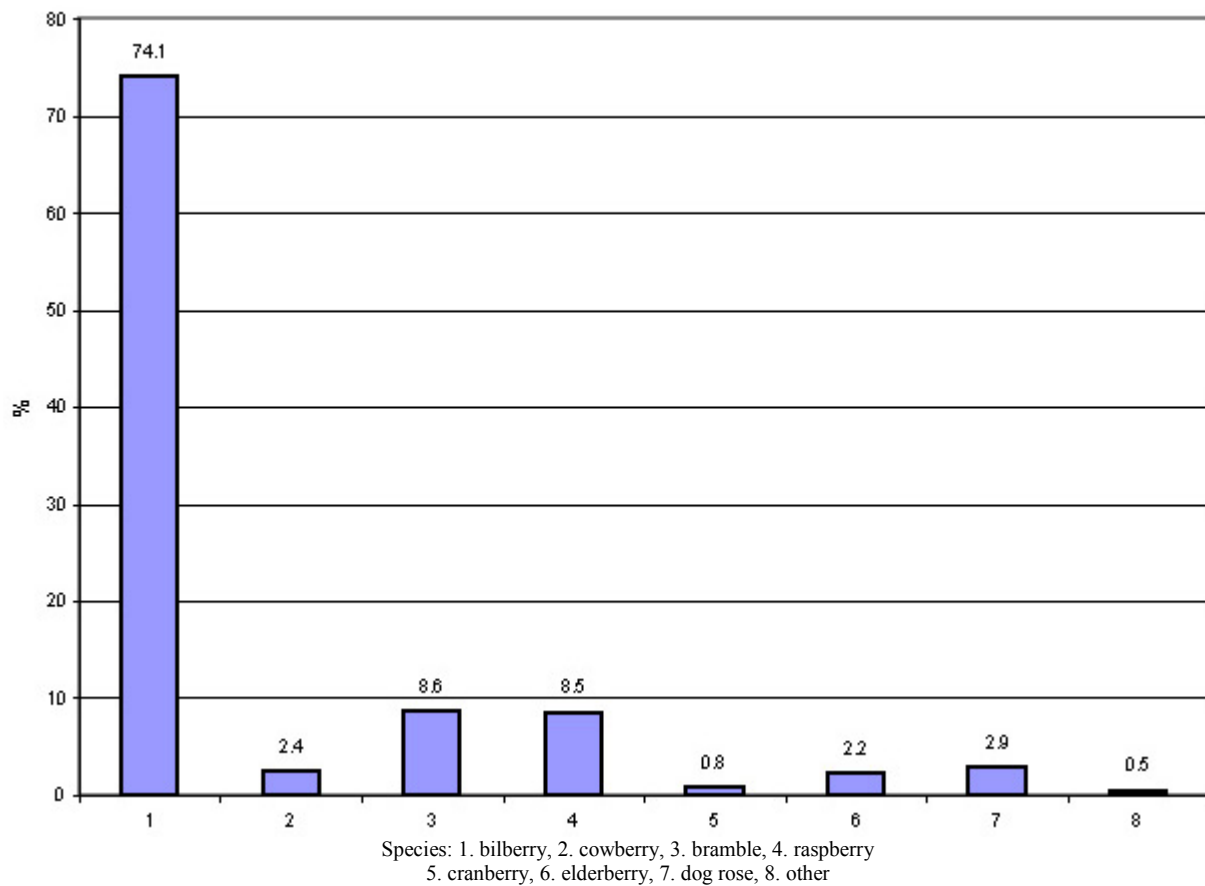
The average household which reported sale in a purchasing centre sold nearly 60 kg of fruit and 18 kg of mushrooms, only leaving about 24 kg of fruit and 32 kg of mushrooms for their own needs (Fig. 14). Although NWFP were sold by the road more rarely than at marketplaces (as was mentioned above), the amount of these products in kg/household was similar for both forms of sale.

Fig. 14. Use of harvested fruit and mushrooms – structure in kg/household



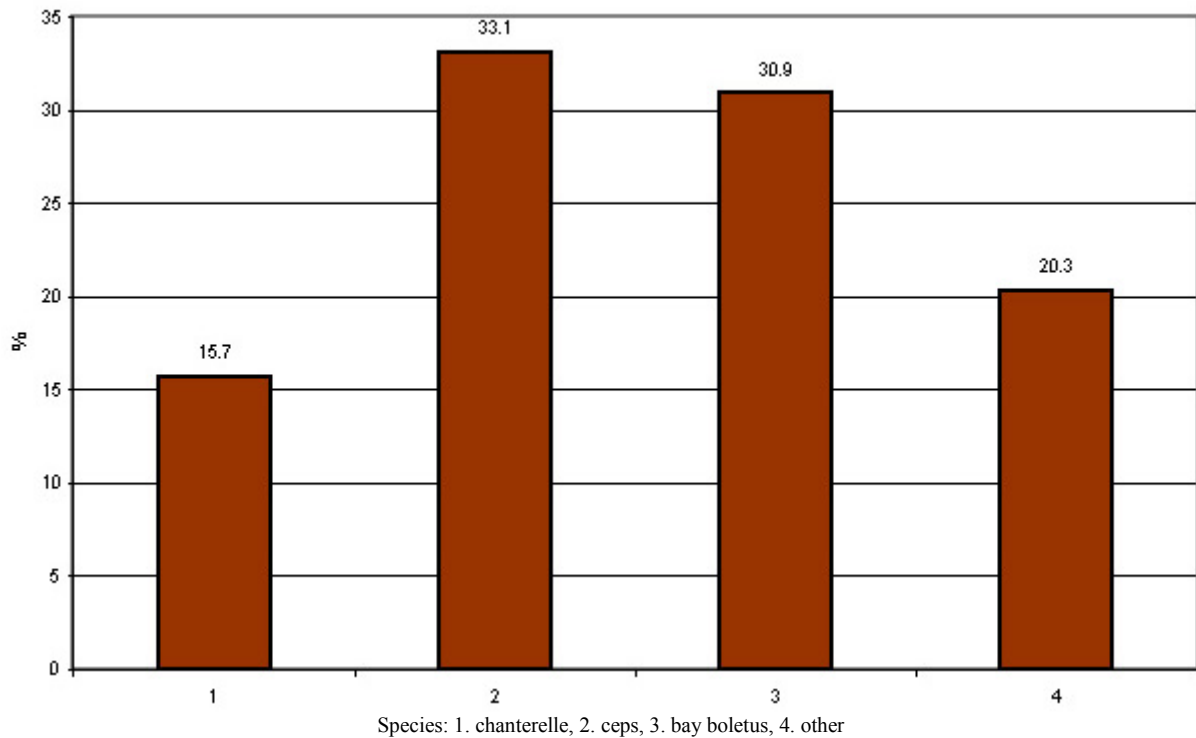
In the species structure of the harvested fruit, considering the harvested amount (kg), the dominant species was bilberry (over 70%). The share of each of the other species did not exceed 10% (bramble and raspberry could be distinguished here) (Fig. 15).

Fig. 15. Species structure of harvested fruit



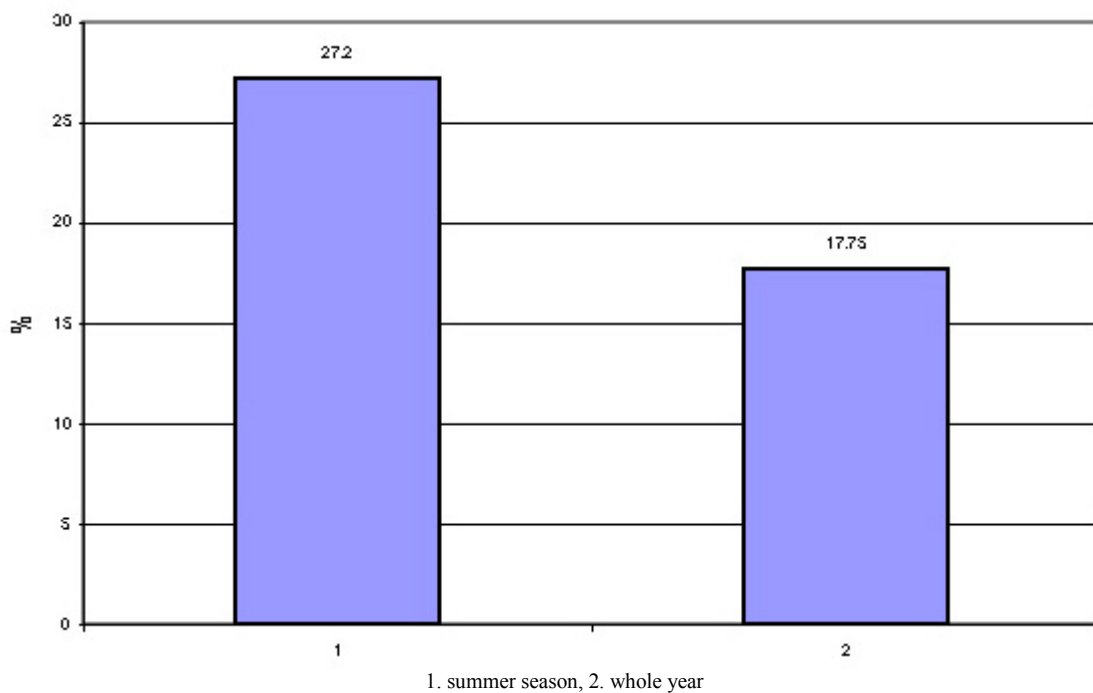
In the species structure of mushrooms ([Fig. 16](#)), the dominant ones were ceps and bay boletus (each species constituted about 30% of the total amount harvested).

Fig. 16. Species structure of harvested mushrooms



The average income from NWFP sale was 27.2% of the overall income of households in summer season (from 1st June to the end of October 2004); and 17.75% of the income calculated for the whole year ([Fig. 17](#)).

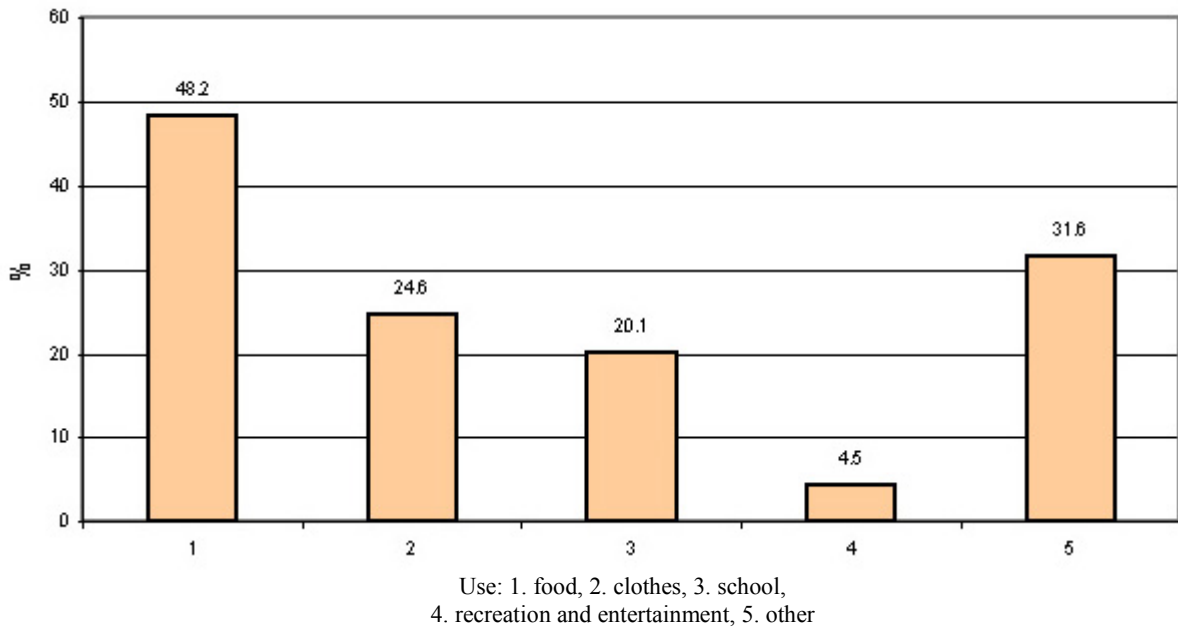
Fig. 17. Average income of households from NWFP sale, in % as compared to overall income



The maximum share of the income from NWFP sale in summer season 2004, reported in one household, was 100%. Therefore in that season this family had no other income except from forest products sale. The maximum share of the income from forest products sale in the whole year was 80%. Such a value was given by 4 households.

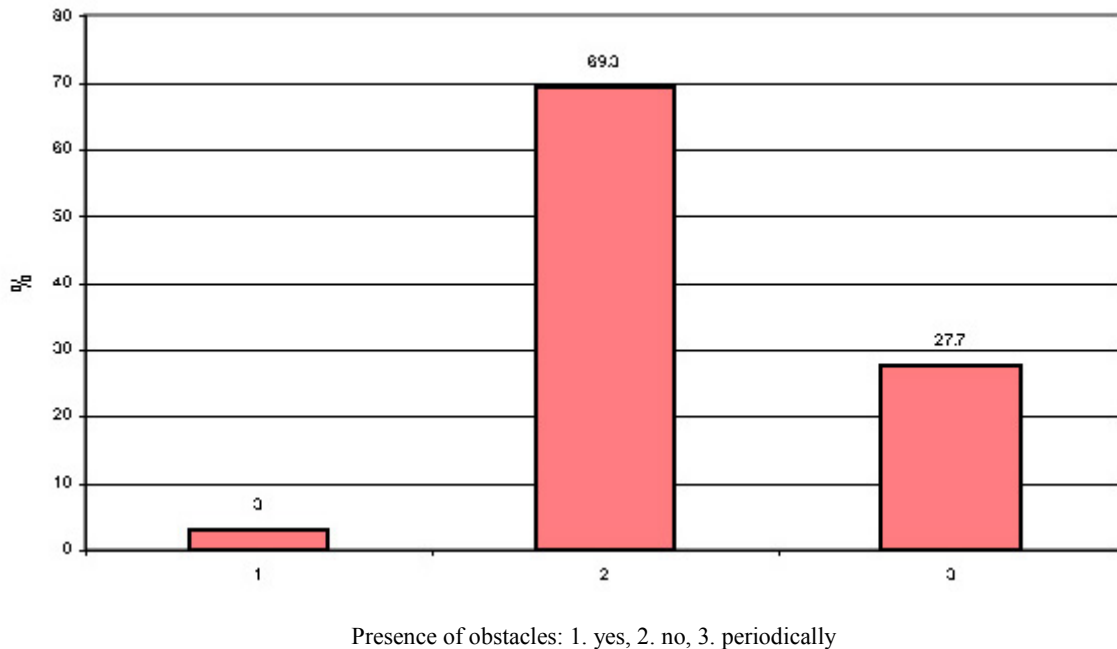
Nearly 50% of households used the income from NWFP to purchase food; many of them chose more than one answer, e.g. clothes or expenses for school (Fig. 18).

Fig. 18. Use of income from NWFP sale



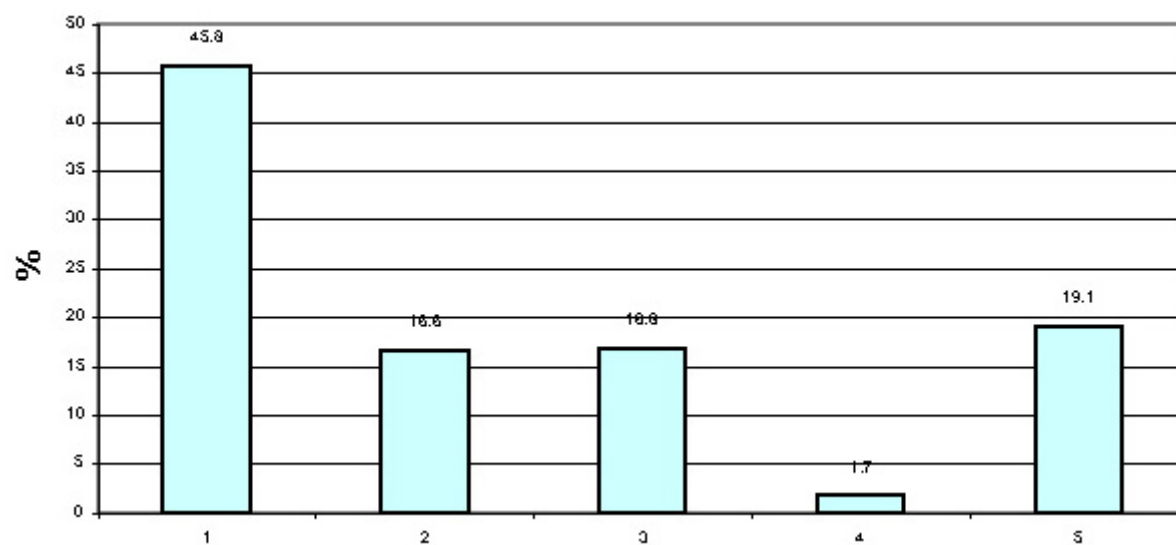
Most respondents did not encounter any obstacles to access to forest on the side of foresters; about 1/3 experienced such difficulties periodically (Fig. 19).

Fig. 19. Obstacles to access to forest on the side of forest service



Most families do not use any means of transport to get to the forest (Fig. 20); the smallest number of families use public transport, such as bus or train.

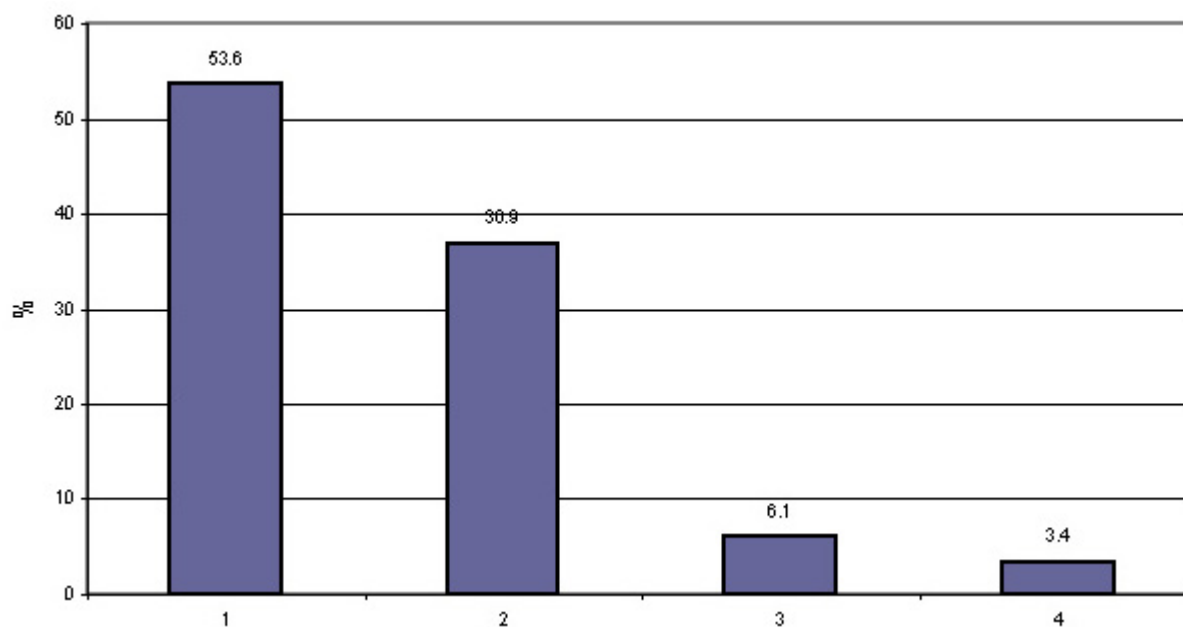
Fig. 20. Means of transport to forest



Means: 1. on foot, 2. bicycle or motorcycle, 3. car, 4. public transport, 5. other

Therefore the majority do not bear any costs of transport to forest and in about 37% of households these costs do not exceed 5% of the value of the harvested NWFP (Fig. 21). The average distance from forest was about 4.55 km.

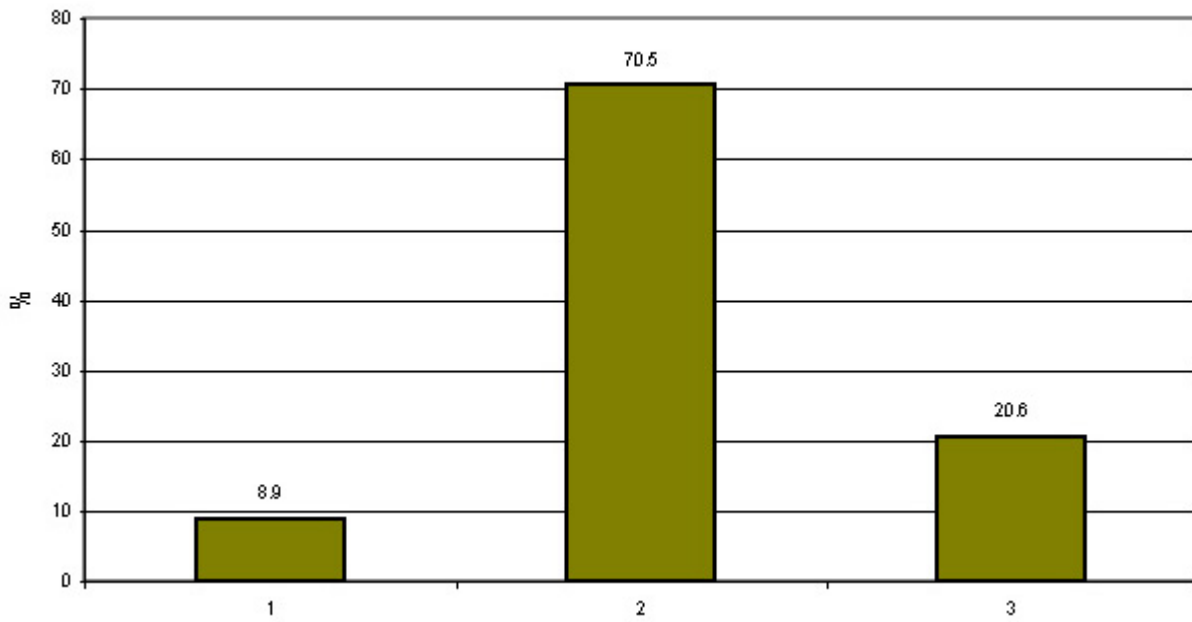
Fig. 21. Share of transport costs in value of harvested NWFP



Share: 1. none, 2. Up to 5%, 3. 6 to 10%, 4. above 10%

A considerable number of families (over 70%) are not willing to establish their own processing plant for forest fruit or mushrooms or to set up their own purchasing centre for NWFP (Fig. 22).

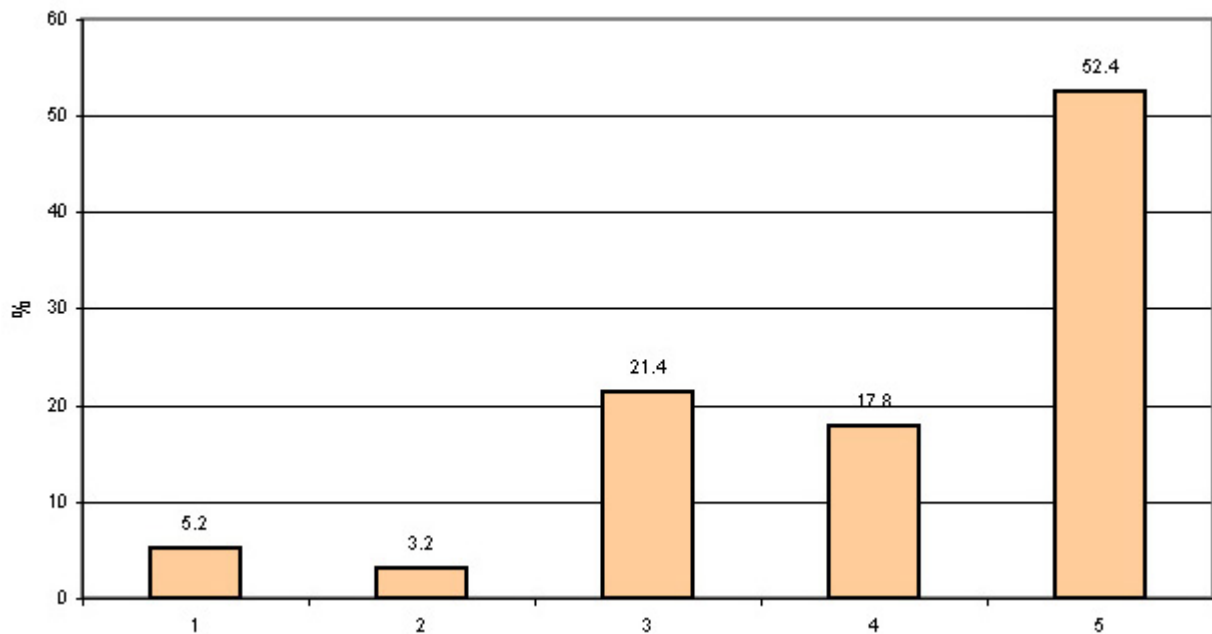
Fig. 22. Willingness to set up a processing plant or purchasing centre for NWFP



Offer: 1. yes, 2. no, 3. no opinion

Some respondents explain that this is unprofitable or that they have no financial means for such an investment; most respondents chose as their answer “other” reasons ([Fig. 23](#)).

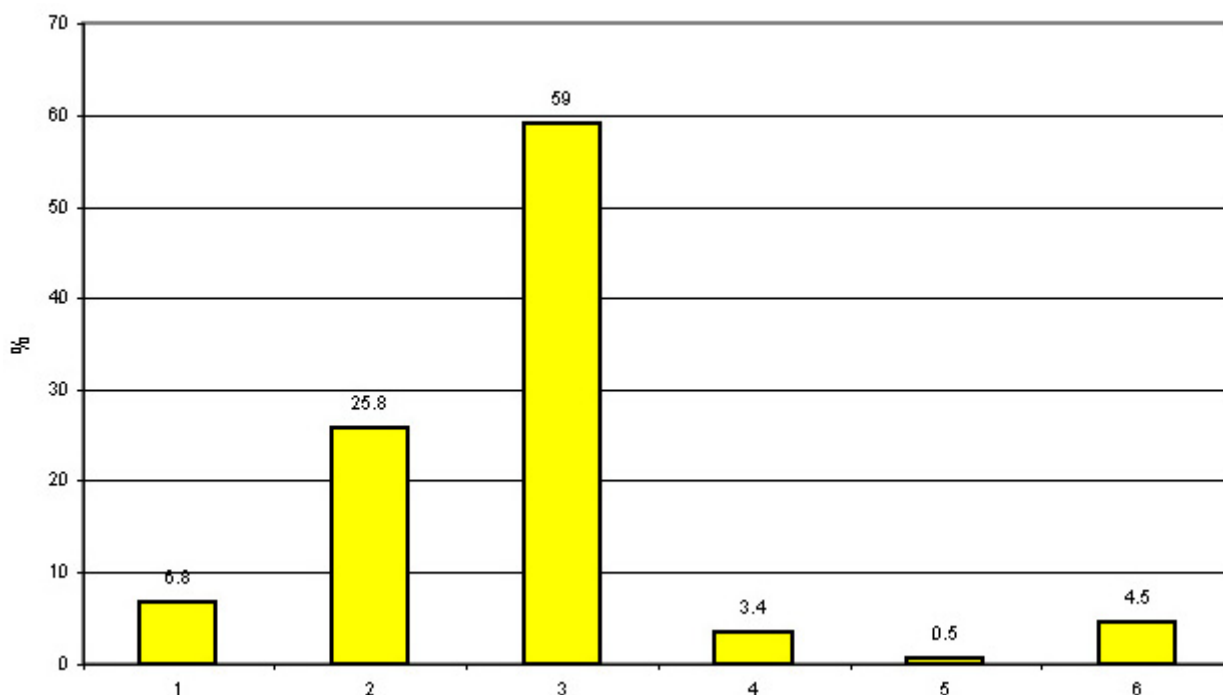
Fig. 23. Reasons for unwillingness to set up a company



Reasons: 1. complicated regulations, 2. high taxes, 3. unprofitable character, 4. lack of finances, 5. other

The most frequently selected answer to the question concerning living standards was “average” standard (261 surveys, i.e. 59% of all of them) and, next, the “low” one (114 surveys, i.e. nearly 26%); 20 respondents (4.5%) did not answer this question ([Fig. 24](#)).

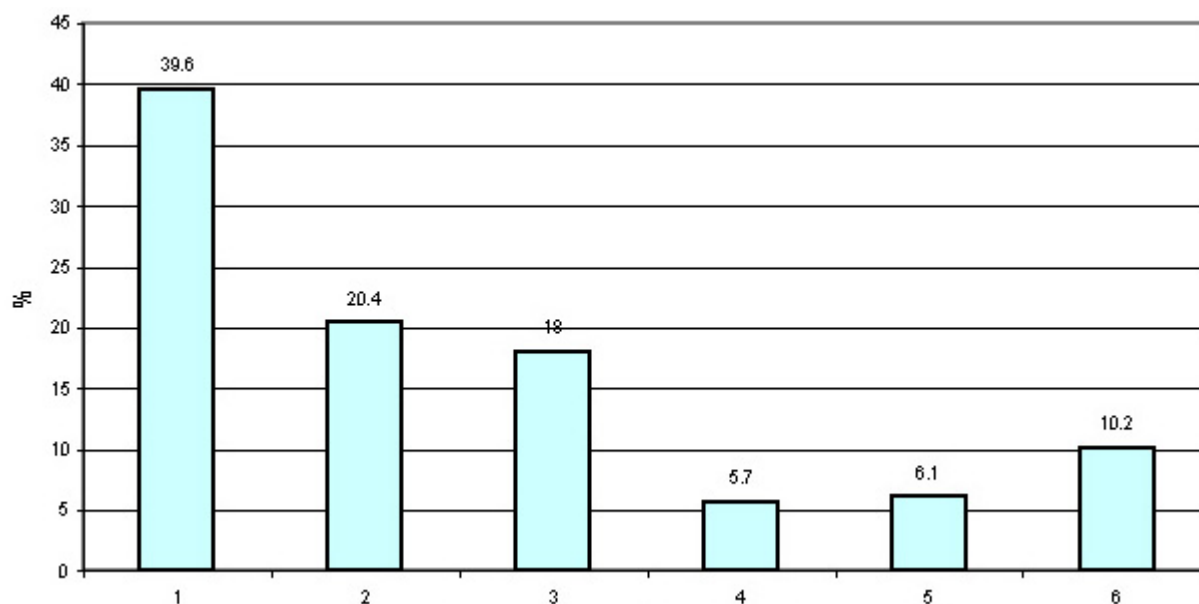
Fig. 24. Living standards in households' opinion



Standards: 1. very low, 2. low, 3. average, 4. high, 5. very high, 6. no data

Due to a small number of respondents who declared high and very high living standards (altogether 17 surveys, i.e. 3.9%), these two groups were – for the purpose of further analysis – joined into one, which reduced the scale of living standards to four levels. Most respondents (175 surveys, i.e. nearly 40%) did not say that harvesting NWFP influenced their living standards (Fig. 25). This part of research reveals a decreasing tendency concerning the number of respondents: from a lack of influence towards strong influence of NWFP collection on families' living standards. About 10% (45 households) did not answer this question.

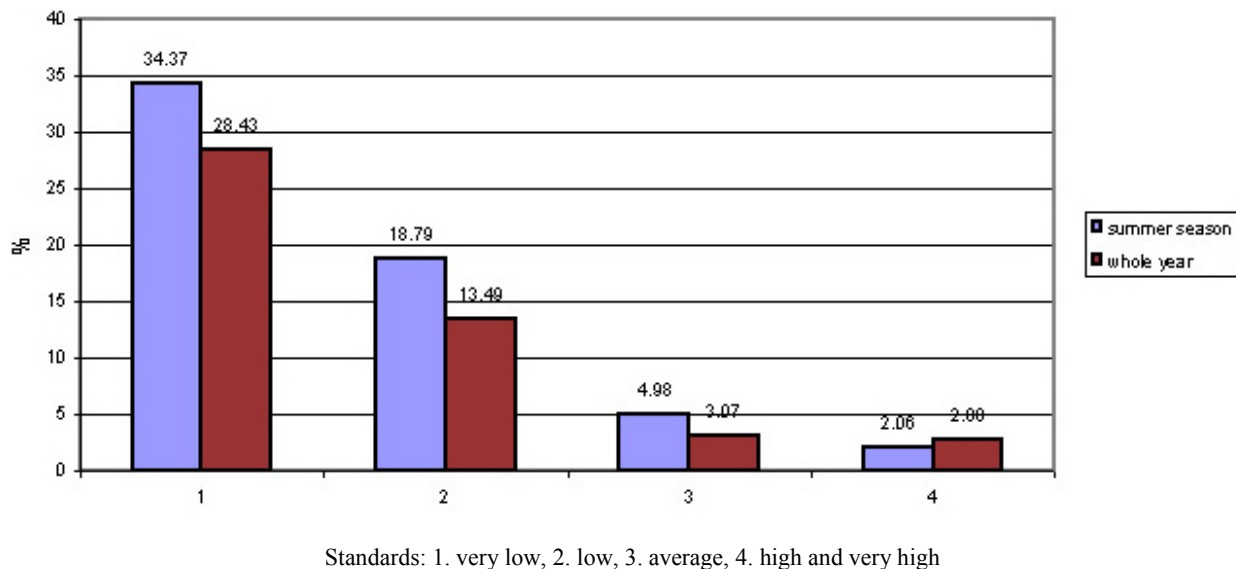
Fig. 25. Influence of NWFP harvesting on households living standards



Standards: 1. very low, 2. low, 3. average, 4. high, 5. very high, 6. no data

An analysis of the data showed a strong relation between the reported income from NWFP sale and family living standards (Fig. 26): the greatest income was noted in the group with very low living standards; the smallest share was in the group with high and very high living standards.

Fig. 26. Income (in % as compared to overall income) from NWFP sale in summer season and whole year, related to households' living standards



The largest harvest (kg/household) was, paradoxically, reported not in the group with the very low living standards but in group 2, with low living standards, and next in groups with high and very high as well as with average living standards (Fig. 27).

Fig. 27. Size of harvest of fruit, mushrooms and medicinal herbs altogether), related to households' living standards

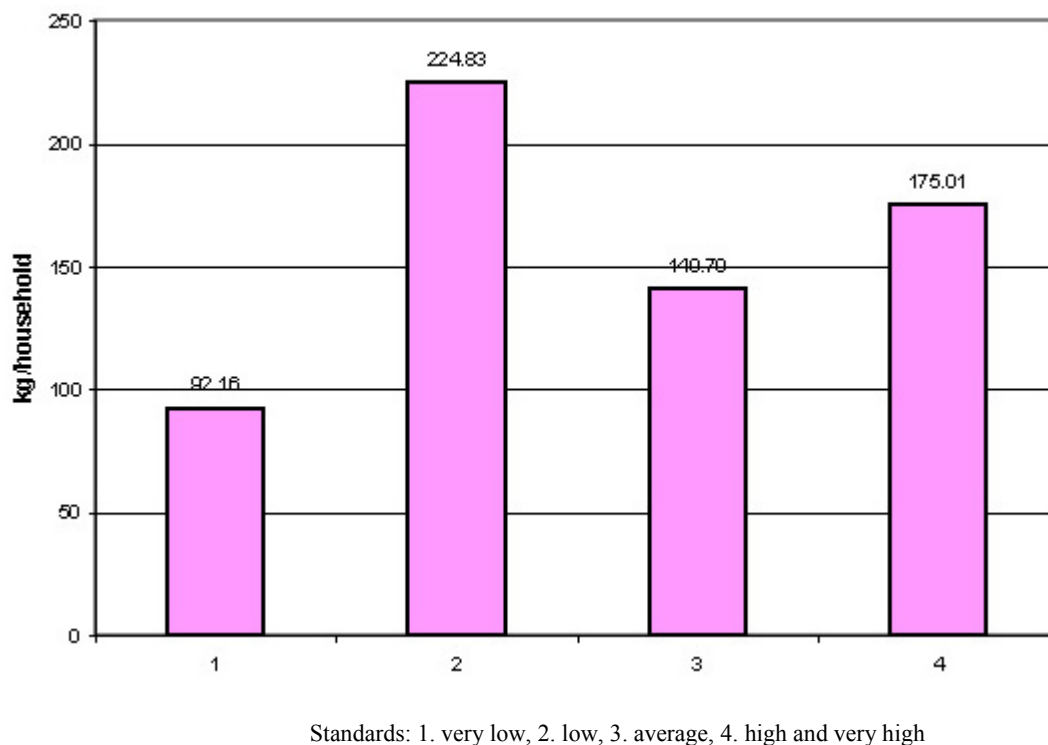
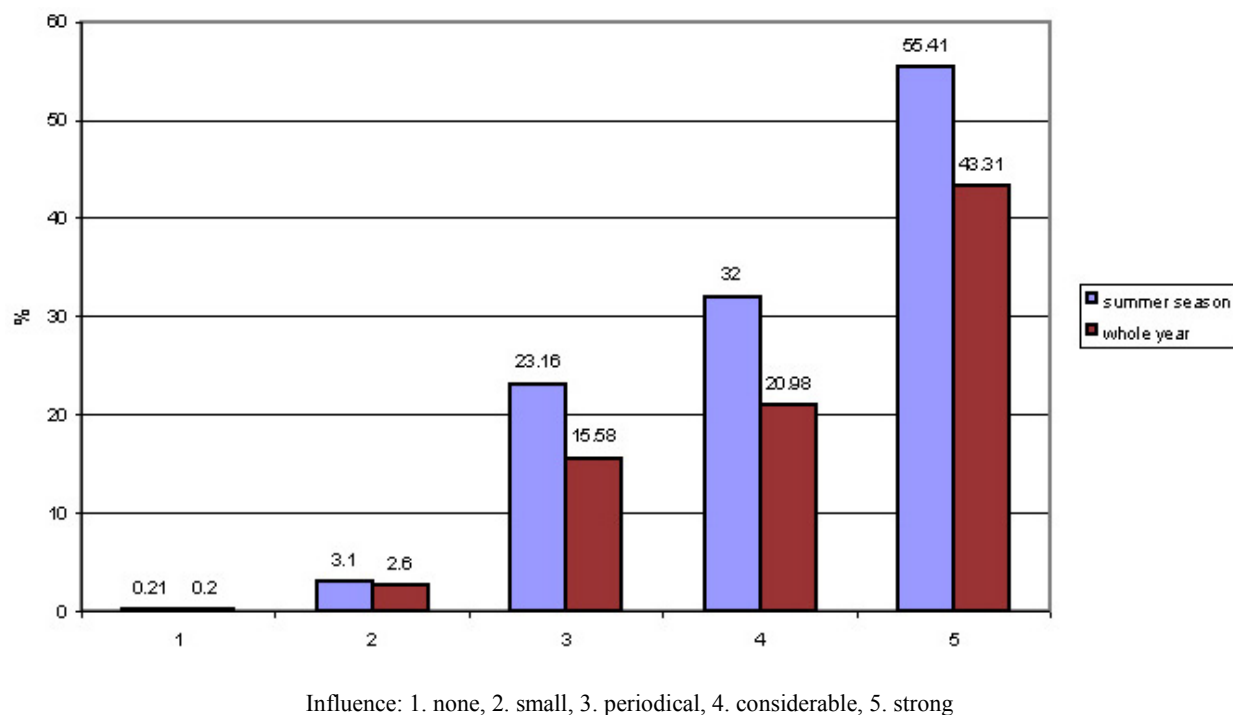


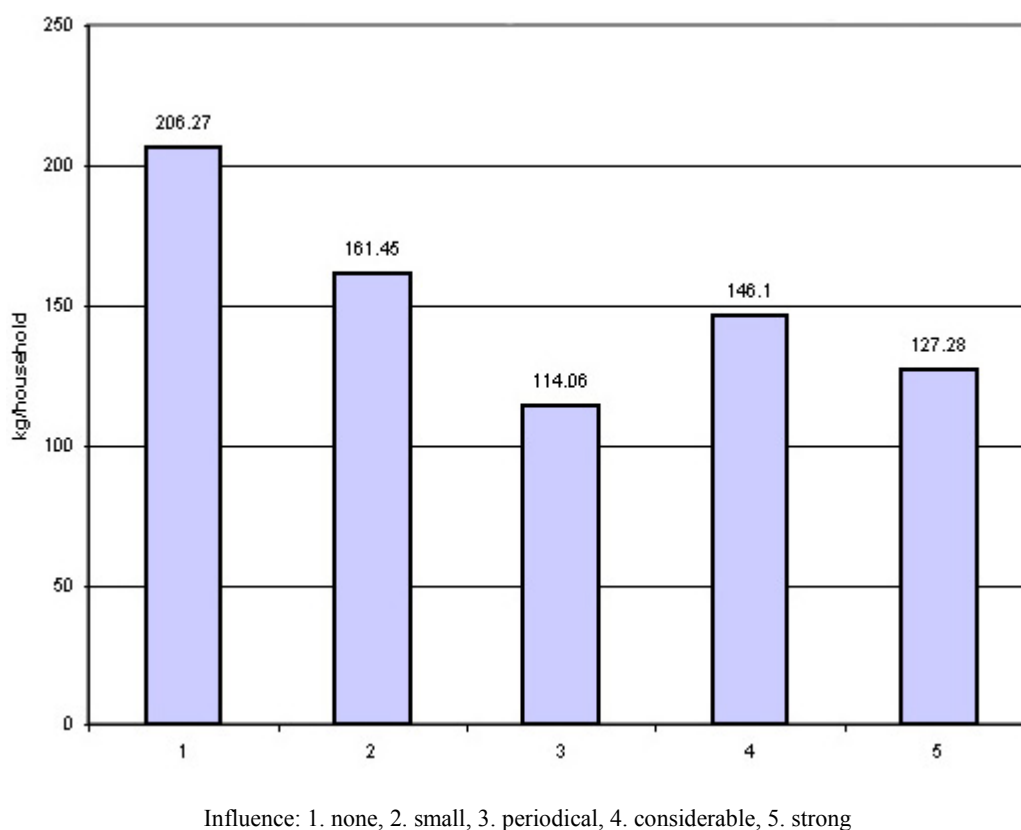
Figure 28 presents a considerable relation between income from NWFP sale and its influence on the living standards of families: this influence increases with increasing income.

Fig. 28. Income (in % as compared to overall income) from NWFP sale in summer season and whole year, related to its influence on households' living standards



The largest harvest of NWFP (kg/household) was noted in those groups of families which do not think that it might have a significant influence on improving their living standards (Fig. 29).

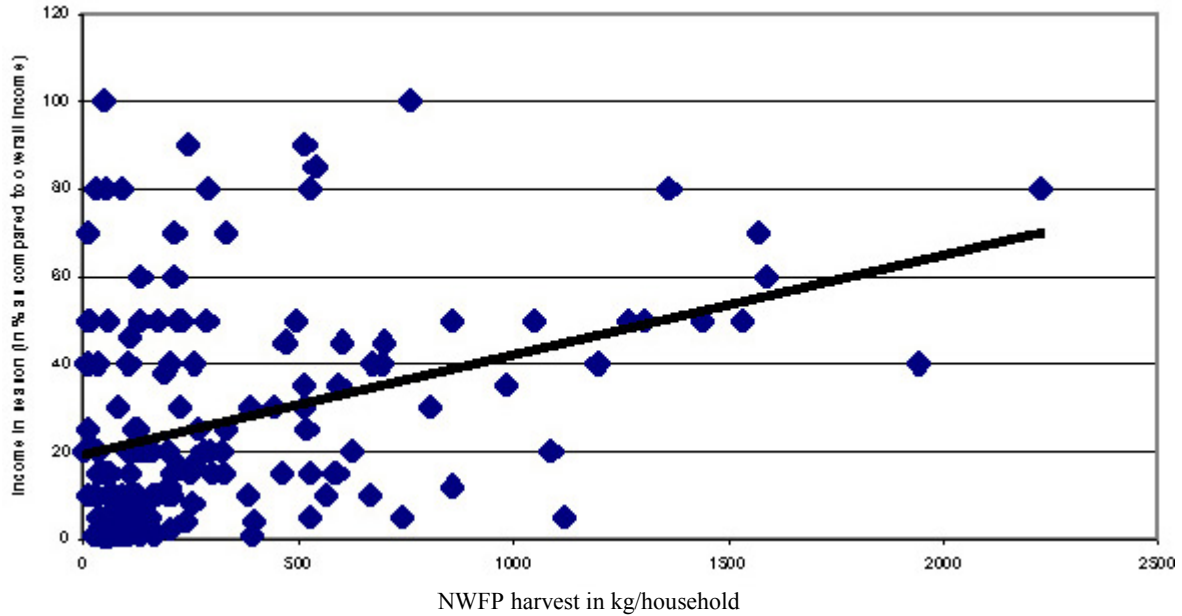
Fig. 29. Size of harvest of fruit, mushrooms and medicinal herbs (altogether), related to estimation of its influence on households' living standards



Statistical analysis showed a significant ($p=0.05$) relation between the total harvest of fruit, mushrooms and medicinal herbs (in kg/household) and the income from sale in summer season 2004. The correlation coefficient,

being on the level 0.373, shows an average strength of this relation (Fig. 30). It must be emphasized that the dependence concerns mainly two groups of analysed households: with low and average living standards, which amounts to over 80% of all families under investigation.

Fig. 30. Influence of fruit, mushrooms and medicinal herbs joint harvest size on income from its sale during summer season



Testing the dependency between living standards and the influence of NWFP harvesting on these standards, a statistically significant dependency was confirmed (value $\chi^2 = 86.48187$, $df = 12$, $p = 0.000$). A significant relation between these estimations is evident in the group of families with very low living standards, which gave the largest number of answers indicating the great significance of NWFP harvesting on improving their living standards (Table 1).

Table 1. Influence of NWFP harvesting on living standards of groups of households under research

Living standards	Influence on living standards					Households together
	none	small	periodical	considerable	strong	
very low	2	5	8	5	10	30
	6.67%	16.67%	26.67%	16.67%	33.33%	100%
low	27	31	31	9	11	109
	24.77	28.44	28.44	8.26	10.09	100%
average	131	52	39	9	5	236
	55.51	22.03	16.53	3.81	2.12	100%
high and very high	11	1	2	1	1	16
	68.75	6.25	12.50	6.25	6.25	100%

A weaker relation between both features is observed in groups of households whose living standards are average, and especially high and very high.

DISCUSSION

A comparison of the total amount of NWFP harvested by households under analysis (about 41.5 thousand kg of fruit and nearly 30 thousand kg of mushrooms) with the national data obtained from the official purchase in 2003 [6] allows for a conclusion that the amount noted in the present research is very large and constitutes 0.3% (for fruit) and as much as 1.1% (for mushrooms) of annual national purchase. The present research was conducted in 442 households, 378 of which reported NWFP harvesting, which amounts to about 0.003% of all households in Poland [7]. The research focused on families which have strong ties with forest (families for which NWFP harvesting could be significant). This fact may be the reason for a considerable discrepancy concerning the amount of harvested products per household, when e.g. compared to the data supplied by Saastamoinen in Finland [8], and especially Sisak in the Czech Republic [9]. These authors carried out their research on a number of households selected randomly out of the whole population of their countries.

The species structure of fruit harvested by families under the present survey is approximately the same as in the years 1956-85 (the data quoted by Głowacki [4] on the basis of official purchase in those years). Bilberry is a dominant species (according to Głowacki it was 62%) and a few per cent of bramble and raspberry are noted. There is a significant difference in the case of elderberry, large amounts of which were noted by Głowacki and which is an important item in the yearly records of the Central Statistical Office (Główny Urząd Statystyczny) [1]. As far as the species structure of the harvested mushrooms is concerned, the present survey noted about a three times smaller amount of chanterelle but a much larger amount of ceps in comparison with both the data quoted by Głowacki and the current official purchase data. These differences may be due to changing preferences of purchase (e.g. an increasing demand for medicinal species of fruit) and of households (which may opt for more traditional species of fruit and mushrooms).

What needs to be emphasized in the survey results is a very high percentage of replies which state no obstacles to access to forest on the part of foresters. Bartczak [2] notes that 82% of Poles are in the forest at least once a year and 34% visit forest more than once a month. This percentage is higher only in the Scandinavian countries. Periodical obstacles, reported by some of the respondents, result from special regulations of Polish forestry, e.g. a ban on entrance to forest cultures, to some forest reserves and - what has been important in recent years - a ban on entrance to forest during periods of prolonged drought. Polish forests are open to the society, everyone can collect fruit and mushrooms there. Forests are very attractive places for recreation and offer an opportunity to support family budgets.

The families under survey were characterized by a larger number of members than the national average, which in 2003 was 3.09, but close to this number in families of farmers, which was 4.21 [7]. The average number of retirees and pensioners per household was in the families under survey also larger than the national average (0.74) or farmer families (0.63). It could therefore be concluded that the present research concerned families with lower financial status than the average in Poland although a large majority of respondents classified their families to the group with average living standards. The level of poverty is also indicated by the reported use of the income from NWFP sale: mainly for buying food.

Generally, the data in Figures 26-29 and [Table 1](#) show that the poorest families (group 1) appreciate the possibility of NWFP harvesting and emphasize that it very strongly improves their living standards, at least periodically (probably this income is sufficient only for a short time – in the harvest period). Strangely enough, this group reports small amounts of NWFP. The members of these families are probably unable to harvest more for various reasons, which are sometimes additionally explained in the surveys (old age, illness).

Group 2, with low living standards, i.e. very close to group 1 (the poorest), reveals another kind of differences. Group 2 harvests very large amounts of NWFP and earns a relatively high income but only relatively few families think that it has a considerable or very strong influence on their living standards (periodical influence was reported in 1/3 of cases).

Finally, the richest group, with high or very high living standards, harvest a lot of NWFP but treat it as a kind of recreation because they either do not report any influence on their living standards or state that this influence is very small. This may be due to the fact that these families sell only small amounts of the NWFP that they harvest or that their income from other sources is high.

SUMMING UP AND CONCLUSIONS

1. Against the statistical background of an average family in Poland, the households under present research belong to those with a larger number of members and have more retirees and pensioners. For this reason it might be said that their living standards are below the national average. The present research reveals that NWFP harvesting was reported to be the most frequent reason for visits to forest among the respondents.
2. The families which are harvesting more NWFP now than in the past explain it by their deteriorating living standards. The families which harvest less NWFP (this research noted most such answers) explain it by smaller fructification or other reasons, such as old age or illness, which make harvesting difficult.
3. Among the seven groups of NWFP considered in the present research, the most frequently harvested one is mushrooms, and then fruit; however, fruit is collected in larger amounts than mushrooms. Other groups of NWFP which are frequently reported are: fuel; after that – decorative branches; and finally – medicinal herbs. Fruit and mushrooms are most frequently used for households' own purposes. Among various forms of NWFP sale, the most important is sale of fruit in purchasing stations.
4. The income from NWFP sale, which amounts to 27.2% of overall family income during summer season 2004 and 17.75% in yearly scale, was most often used to buy food.

5. The present research shows relations between NWFP harvesting and the general economic situation of the households under survey. The results allow for the conclusion that the families with very low living standards appreciate the influence of NWFP harvesting on improving these standards. The richest families also take advantage of NWFP to a large extent. However, they do not treat these products as a source of income but rather as an element of recreation.

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ANNEX

QUESTIONNAIRE

Department of Forest and Wood Utilization, Faculty of Forestry, Agricultural University of Cracow
(The survey questions can be answered only by persons over 18 years old, the survey is anonymous)

Province of Poland:

Regional Directorate of State Forests:

Forest Division:

Name of village or town:

Size of respondent’s residential village or town (number of inhabitants):

Questions 1 to 4 concern the “head” of the examined family

1. Sex: a. male, b. female

2. Age: a. 19-25, b. 26-30, c. 31-60, d. above 60

3. Profession/ occupation:

a. unemployed or household member employed by family care b. retiree or pensioner c. student, pupil d. forester or similar profession (gardener, farmer) d. other occupations

4. Marital status: a. married b. single (widow, widower, divorced, unmarried)

Next questions concern household (family living together)

5. How many persons live together in your household:.....

6. Namely - how many children up to 15 years old:.....

7. Namely - how many pensioners and retirees:.....

8. Namely - how many unemployed:.....

9. The main reason (aim) for your visits to the forest:

a. collecting of NWFP b. recreation c. both reasons (a. and b.) d. other e. we never go to the forest

If you answered 9 b., d. or e. don't answer the next questions (or only points 26 to 28)

If you answered 9 a. or c. please answer the next questions:

10. How many members of your family take part in NWFP collection: persons

11. In collecting of NWFP take part (it concerns your household, you can choose more than one answer):

a. whole family b. household members employed by family care c. employed d. unemployed e. pensioners and retirees f. children up to 15

12. In the last 10 years has the amount of NWFP collected in your household:

a. increased b. decreased c. been the same

13. If you chose 12a. give the main reason for increase:

a. bigger fructification b. higher income from the sale c. worsening of the financial situation of family d. better ways of transport to the forest e. other

14. If you chose 12 b. give the main reason for decrease:

a. smaller fructification b. smaller income from the sale c. improvement of the financial situation of the family d. worsening ways of transport to the forest e. other

15. The amount of collected forest fruit in kg per household, per summer season 2004 – divided into : your own needs, official purchase, market sale and sale by the road (listed in table): bilberry..... cowberry..... bramble..... rasperry..... elderberry.....cranberry.....dog rose..... other.....

16. The amount of collected fresh mushrooms in kg/household/summer and autumn season 2004 – divided into: your own needs, etc.....: chantarelle.... ceps..... bay boletus.... other.....

17. The amount of collected medicinal herbs – green weight in kg/household/summer season 2004:.....

18. Other kinds of NWFP collected from the forest (within the whole year 2004):

a. bark b. decorative branches (*Abies alba*) c. fuel wood d. other (which products)?

19. What is the percentage of the value of NWFP sold in summer/autumn season 2004 (together: purchase, market sale, sale by the road) as compared to overall seasonal income of your family? about.....%

20. What is the percentage of the value of NWFP sold in the whole year 2004 as compared to annual overall income of your family? about.....%

21. How do you spend the money from NWFP sale (mainly):

a. food b. clothes c. school d. recreation and entertainment e. other

22. Are there any difficulties in the access to the forest and NWFP collection on the side of foresters:

a. yes b. no c. periodically, in connection with forest regulations

23. The average distance from the forest – place of NWFP collection (km):.....

24. Main means of transport to the forest:

a. on foot b. bicycle (motorcycle) c. car d. public transport (bus, train) e. other

25. Approximate share of transport costs in the value of collected NWFP:

a. none b. up to 5% c. 6 to 10% d. above 10%

26. Would your family like to set up a firm which would deal with NWFP purchase or processing:

a. yes b. no c. I don,t know

27. If you chose 26 a. – why?

a. good chance of succeeding b. dependable supply of NWFPs from nearby forests c. little chance of other sources of income d. other

28. If you chose 26 b. – why?

a. complicated regulations in Poland b. high taxes c. unprofitable character d. lack of money to set up e. other reasons

29. According to you, is the standard of living in your family (household):

a. very low b. low c. average d. high e. very high f. no opinion

30. Does NWFP collection help in poverty alleviation in your household:

a. no b. to a small extent c. yes (but periodically) d. yes e. yes, to a large extent e. no opinion

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