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# LOCAL COMMUNITIES AND MUREȘ FLOODPLAIN NATURAL PARK ROMANIA: A COMMON FIGHT AGAINST INVASIVE SPECIES

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## Abstract

Invasive plant species, like Indigo bush *(Amorpha fruticosa L.),* Boxelder *(Acer negundo L.),* Japanese knotweed *[Fallopia japonica (Houtt.) Ronse Decr]* are altering the conservation status of terrestrial ecosystems along the Mureș Floodplain Natural Park in Romania. On a long run, and a large geographic scale, the invasive species have a high potential to generate a negative impact on the environment and the economy. Hence there is a stringent need of preventing, tracking down, and controlling invasive species. The research was carried out along with an awareness campaign meant to raise the knowledge of the local population regarding the danger of continuous expansion of invasive species through unsustainable agricultural practices. The fieldwork was conducted between September 2015 and April 2017 and consisted of a survey filled in by 240 respondents. After applying the principal component analysis on the answers given to a set of closed questions, we found that most of the attendees considered the meetings and the dissemination materials as important, but some local communities are against fighting Indigo-bush and other invasive species, and consider the cost of intervention is too high. This discrepancy between the degree to which local people appreciated the project and the degree to which they really want to get involved in fighting invasive species shows that grassroots awareness campaigns are still needed.

*Key words:* awareness campaign, invasive species, local communities, management, protected area

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## 1. Introduction

According to the International Union of Nature Conservation (IUCN), the occurrence of invasive alien species (IAS) is second only to habitat loss as the most significant threat to biodiversity (McNeely et al., 2001). Around 12.000 alien species have been recorded in Europe, of which 10-15 % are IAS. The European Environment Agency reported that almost one third of the 395 native European species are listed in the IUCN Red List of Threatened Species as 'critically endangered', with the major threat coming from invasive alien species (Altmayer, 2015). At a global level, the IUCN Red List database documented that IAS is identified as a major factor in 54% of all known species extinctions and the only factor in 20% of extinctions. This impact of IAS prompted the European Commission in 2011 to propose the European Union (EU) biodiversity strategy to 2020 that was adopted in 2016 (EP, 2016).

According to Albers et al. (2018), Epanchin-Niell and Hastings (2010), Lonsdale (1999) and Valery et al. (2008), a biological invasion occurs when one or more IAS take advantage over the native species, doomed to disappearing if whatever obstacles failed to stop the proliferation of the invasive ones.

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There is a growing stakeholder interest in biodiversity conservation are concerned about the negative impact IAS may have on the habitat of native species (Benedek, 2018; Sladonja et al., 2015). Because an IAS may have beneficial effects at local scale, in whatever particular socio-economic context (Benesperi et al., 2012), in our case indigo bush is considered a valuable plant by beekeepers (Stefanic et al., 2005), some scholars supported non-regulatory policies on this issue (Valéry et al., 2008).

However, another strand of studies demonstrated that IAS out-competed native species or changed abiotic and biotic conditions (Aguilera et al., 2010; van Oorschot et al., 2017). Citations made in text should only include works that are included in the references list. Please consider the observation throughout the text.

Natura 2000, the EU network design to protect the most valuable and threatened species and habitats, is based on a different philosophy from the traditional conservation approach. It assumes that traditional activities with low ecological impact may better preserve species and habitats than strict protection would (Tsiafouli et al., 2013). The key qualitative indicator for Natura 2000 is the favorable conservation status for species and/or habitats, a status which is being affected by the fierce competition exerted by IAS. Hence, we cannot improve the conservation status without getting rid of IAS in every Natura 2000 site, especially in those sites where valuable local and even endemic species or habitats are threatened by IAS (Grigorov et al., 2016).

In the research that was undertaken, we tried to gauge to which extent the local communities within a protected area are willing to take action against IAS. A series of meetings, with the aim of raising awareness of IAS, was organized by the Mureș Floodplain Natural Park administration (AMFNP). These workshops formed part of an EEA project entitled "Halting the expansion of invasive plant species in the Mureș Floodplain Natural Park. Taking advantage of these meetings we tested the local people's willingness to join the measures undertaken by the protected area administration, in combating IAS, of which indigo bush is one of the most threatening IAS in Romania.

The main aim of this study is to find out how the attitude of local communities towards fighting IAS can be steered by the administration of the park. These findings will be incorporated into the strategic plan involving the local communities in preventing further spread of *A. fruticosa* and another IAS. Previous studies carried out by park administration and researchers (Dumitrașcu et al., 2014), appointed three major IAS species, that are covering large areas and have a major negative impact, mainly *Amorpha fruticosa L. Fallopia japonica (Houtt.) Ronse Decr,* and on smaller surfaces *Acer negundo L.*

After presenting the scientific background of the proposed IAS we address the legal framework which supports the actions currently taken. Then we describe the pilot area where the awareness actions took place, and the methodology of data collection and statistic processing. Some discussion followed by conclusions close the article.

## 2. Literature review

*A. fruticosa* has a great biopotential and different studies provided sustainable solutions for its utilization, known as indigo bush. The plant has medical use due to high contents of rotenoid glycoside in fruits with antimicrobial and anticancer properties. Besides being a melliferous plant, it is good as forage and biomass for pellets. It also contains substances used by the pharmaceutical industry in the production of insecticidal substances or insect repellents (Ciuvăț et al., 2016). When it comes to the indigo bush, the main driving force for its proliferation is the climate, combined with lack of competing species within the same ecological niche, as shown in Mureș Floodplain Natural Park (Dragota et al., 2015).

Japanese knotweed *(Fallopia japonica (Houtt.) Ronse Decr)* forms a large monodominant community that prevents the growth and development of other plant species, hence reducing biodiversity. This invasive species is found near human settlements, along river banks and in wastelands (Babic and Trkulja, 2014). *F. japonica* is in the UK where its potential to invade urban settlements is well known, aggravated by the effects of climate change, even though biocontrol actions were undertaken (Djeddour and Shaw, 2014).

Boxelder *(Acer negundo L.)* is a tree native to eastern North America, introduced into Romania in forest plantations and anti-erosion forest belts, as well as for ornamental purposes. It easily spreads from its cultivation sites due to high fruit production and a high tolerance for different habitats. In the Mureș Floodplain Natural Park, the species has low abundance (Dumitrașcu et al., 2014). Local communities are advised not to use this IAS for new plantations.

The abundance, frequency, coverage and ecological significance were studied by Grigorescu et al. (2014) concluding that human beings are an important vector of IAS wide spreading, through transportation and different economic activities. Once these species are introduced into the local ecosystem, they will irremediably change its structure (Blackburn et al., 2011). Therefore, a strand of research focuses on developing species distribution models like Peknicova and Berchova-Bimova (2016) where, soil and habitat type, distance from roads and water corridors were considered as distribution pathways for different IAS. Conservation biology needs to focus on invasion stages, referring in this case to individual populations and not to entire species. Invasions have to be understood as biogeographical because the same species could be invasive in different parts of the world (Colautti and MacIsaac, 2004).

The worst-case scenario that imagines an Era of Globalization of biological invasions need a modeled explicit management strategy with optimal invasive species detection, inspection strategies, and

assessments of different management measures efficiency (Hulme, 2009). Unfortunately, invasive species are more adaptable than non-invasive species, responding even better when resources are depleting (Davidson et al., 2011).

Two previous studies were carried out along the river Mureș and Indigobush *(Amorpha fruticosa L.)* considered one the most important invasive species (Turcus and Dărăban, 2012). The plant is adapted to all types of environment and prefers mainly riparian ecosystems but can also be adapted to reduced soil moisture (Dumitrașcu et al., 2014). In wetlands, *A. fructicosa* is considered to be first in terms of impact on local habitats and flora (Dumitrașcu et al., 2013). Previous studies showed that *A. fruticosa* had been coppicing vigorously (Takagi and Hioki, 2013) and also proved a high dispersal capacity through seeds, rarely by sprouts or layering (Dumitrașcu et al., 2014). Studies carried out in Hungary revealed that *A. fructicosa* contains rotenone, a natural insecticide, which explains why the phytophagous insects avoid this plant.

Sărățeanu et al. (2007) demonstrated that Romanian grasslands were invaded by *A. fruticose* due to poor management, large abandoned land offering favourable condition for *A. fructicosa.*

When it comes to biodiversity issues, IAS are among the least important priorities, hard to grasp by an appropriate legal system. Somehow this situation is normal because the protected species barely touch the public agenda, while the media is still prone to overlook ecological issues. The local administration and scientific bodies do not have adequate monitoring capacity. Hence, emergency measures cannot be drafted as there is the lack of capacity to discern the difference between native protected species and alien species.

The general public has limited knowledge on native protected species with even less awareness of IAS, despite strategies on controlling IAS attempting to address issue.

EU 2020 Biodiversity Strategy contains target 5 ‘Combat Alien Invasive Species' which refers to identify and prioritize their pathways, priority invasive species are controlled or eradicated, managing the pathways in order to prevent the introduction and establishment of new invasive species (EC Communication, 2011).

In 2014 the EU Regulation (2014) concerning the preventing and management activities necessary to be taken against of the introduction and extension of IAS. This regulation is meant to increase the resilience of the ecosystem to current and future invasion. Biological, physical and chemical actions are permitted for eradication, population control, and containment. In certain situations, in order to increase the resilience to present and future invasions, some management measures will be applied on receiving ecosystem.

In Romania, the legislative framework is regulated by Ministry of Environment Order No. 979, issued in 2009, on the introduction of non-native species, interventions on invasive species and the reintroduction of indigenous species (MO, 2009).

## 3. Case-study

Mureș Floodplain Natural Park is a natural protected area which falls into IUCN 5th category of protected Landscape and Natural Park. Since 2006, the area has been declared a RAMSAR site, a wetland of international importance, with the same limits of the Natural Park of Mureș Flood. In 2007, the protected area was included in the European Natura 2000 network as a site of community importance - ROSCI0108, in accordance with the EC Directive (1992) on the conservation of natural habitats and of wild fauna and flora, and special avifauna protection area - ROSPA0069, according to the EC Directive, (2009) on the conservation of wild birds, having the same limits as the park, respectively 17455.2 hectares. The geographical coordinates of the park are: North (46 ° 19'01 " Lat. / 20 ° 50'05 " Long.), East (46 ° 18'89 " Lat. / 20 ° 49'94 " Long.), South (46 ° 07'15 " Lat. / 20 ° 91'89 " Long.), West (46 ° 16'82 " Lat. / 21 ° 27'72 " Long.) (AMFNP, 2016).

The climate is continental temperate, moderate, with average annual temperatures of 11 ºC. Winters are mild, with many positive temperatures registered for many years. The maximum average is recorded in July, respectively + 21.4 °C, and the minimum average in January, respectively +1.4 ºC. The average temperature of the vegetation period is 17.6 ºC. The Mureș River occupies an area of 1247 ha within the protected area and has an average flow, in Arad, of 154 $m^3/s$ (AMFNP, 2016). Natura 2000 Network (SPA and SCI) is meant to protect species and habitats against different threats or situations that may hamper their migration like highways, intensive agriculture crops, channels, noisy proximities or IAS.

In Mureș Floodplain Natural Park, the vegetal layer is mainly herbaceous, typical for silvo-steppe; fauna is rich and diverse, as a consequence of the variety of aquatic and terrestrial ecosystems, which provide good living conditions for many species, being inventoried 520 species of plants, within 27 are non-native, and 206 species of birds. One may find here small ponds with still water, marshes, meadows, steppe, and forests, as well as vineyards, orchards, arable lands and human settlements.

In the last five decades, agroecosystems have gradually developed at the expense of natural ecosystems, which, due to fragmentation, became even more vulnerable. Parallel to the increase in agricultural areas, intensive human activity has prompted the invasion of anthropophilic plant species into degraded agrarian and natural ecosystems that hinder the natural development processes and the restoration of natural biogenesis. This phenomenon was followed by a decrease in the number of individuals and the disappearance of some species of fauna.

According to the Mureș Floodplain Natural Park Management Plan the main purpose of having settled this natural park is to protect and preserve some landscapes where the interaction of human activities with nature over time that has created a distinct area of man-nature interactions with high biological diversity (MO, 2016).

From the administrative point of view, the protected area stretches over 13 localities, 8 in Arad county, of which 3 are cities, and 5 in Timiș county, of which one is a city. Analyzing the area of the park across counties, 82.2% of the park area is on the territory of the Arad county and 17.8% on the territory of the Timiș county (Fig. 1).

The land is 49.6% public, 12.1% owned by the local public administrations, and private households (38.3%). The local biodiversity of the Mureș Floodplain Natural Park, is being jeopardized by chemical fertilizers and pesticides in agriculture, overgrazing, land use change, wildfires, extraction of sand and gravel from the Mureș River, urban sprawling, disposal of household waste, new roads and additional infrastructure, uncontrolled tourism, access of motorized vehicles in strictly protected areas. Other threats may come from invasive species, motorboats along Mureș River, and poaching. The only threat outside of management control is the climate change (AMFNP, 2016).

Considering land surfaces covered by IAS (Fig. 2), an awareness campaign for local communities was designed and implemented inside the protected area. The meetings were meant to raise public awareness, inform and provide a platform for debate on the negative effects of invasive species of plants. It was very important that local communities were able to recognize IAS found out there, like *A. fruticosa*, *A. negundo*, and *F. japonica*, bought by unsustainable agricultural practices. Twelve awareness meetings were held in Arad County (Pecica, Secusigiu, Zădăreni, Semlac, Nadlac, Felnac, Șeitin) and in Timis County (Sannicolau Mare, Cenad, Saravale, Periam). In every commune, the target group was the Local Council, its members having a great impact on community actions and initiatives.

The meetings facilitated important findings, like the history of sites invaded by the three IAS and the distribution means. The project team presented actions that are taken for invasive species removal. Since, in this case, the actions are placed in a protected area, the only effective method was the mechanical removal of the plants, using agricultural heavy machinery.

During discussions and field inventory, it was observed that agricultural land abandonment favors spreading of invasive plants. Sustainable agricultural practice is recommended; land abandonment will determine the species invasion and at the same time nitrogen fertilizer as intensive agricultural practice will determine *A. fruticosa* for example, to grow faster, taking advantage of higher nitrogen into the soil. During the mechanical intervention, the local communities were encouraged to act, and the extracted roots and branches were used as firewood. Initiatives for finding interested entrepreneurs in pellets manufacturing were taken.

Direct actions, like mechanical removal, gave immediate and cost-effective results. But a sustainable and long-term action for combating invasive species, the awareness campaigns shall be a sort of win-win game of local communities and protected area administration, too. Local communities have to entrust the agriculture land use by keeping it as productive as possible while the administration of any protected area aims to improve the overall conservation status.

For the project team it was important to have a real feedback on the awareness campaign because it was the first time when this type of action was undertaken in Mureș Floodplain Natural Park.

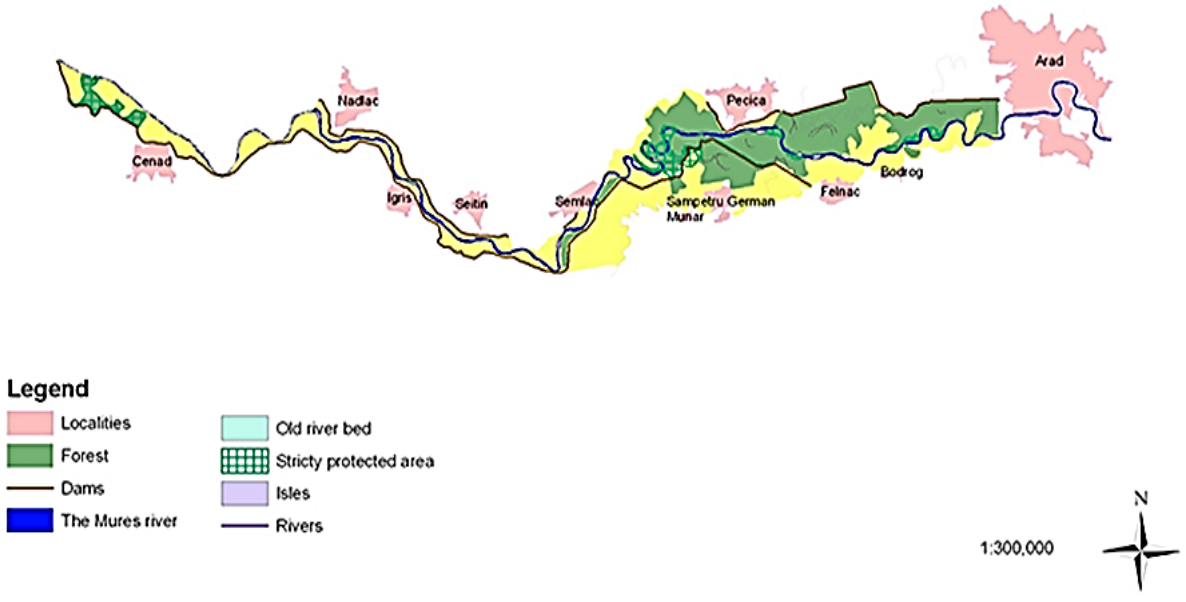



**Fig. 1.** Area of the protected natural areas and its administrative units. Source: AMFNP, (2016)

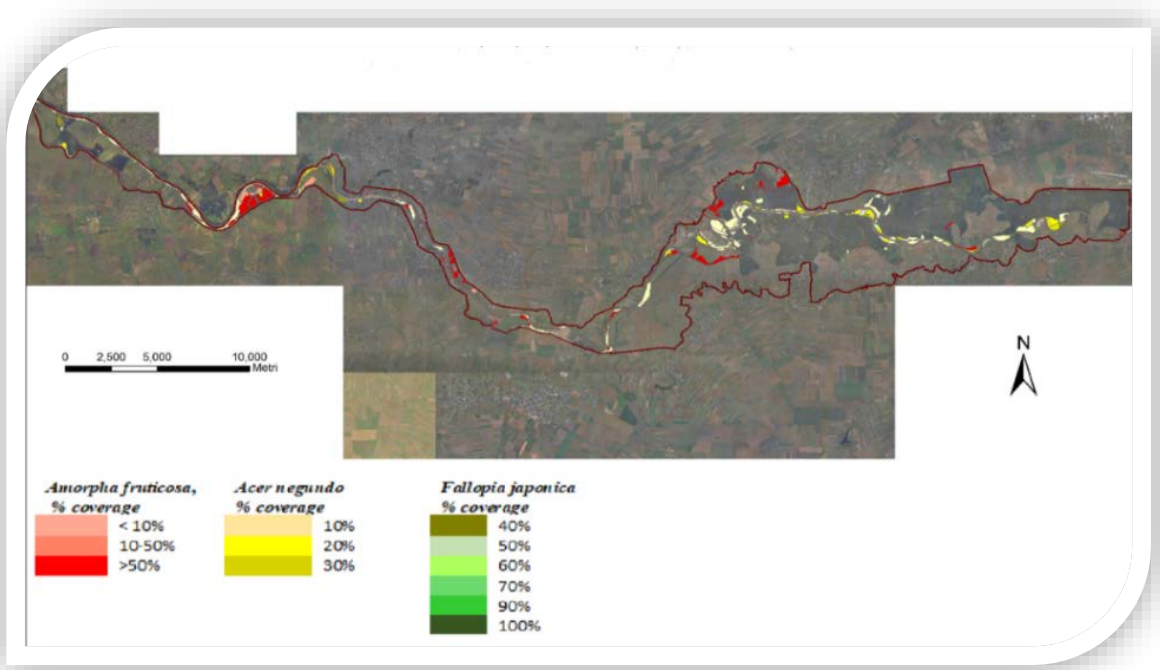



**Fig. 2**. Distribution map of invasive species of plants,*Amorpha fruticosa L., Acer negundo, Fallopia Japonica* into Mures Floodplain Natural Park. Source: AMFNP, (2016)

Therefore, it was important to gauge the attitude of the local communities regarding IAS and the effectiveness of the awareness campaigns. It was considered that all communities where the awareness campaign took place should be surveyed at the end of each meeting. It was considered that Local Council representatives had the greatest opportunity to disseminate the information, being local decision-makers. Our total sample was formed by 240 adults.

The questionnaires were conducted at the end of each awareness meeting to assess the quality of the messages and attitudes conveyed to stakeholders by the project team. The quality of communication between the project promoter and local communities on the issue of invasive species was also assessed by a series of open questions. Eventually, the quality of the given information and the professionalism in exchanging ideas and opinions were also appraised. Two questions also assessed the local communities' perception of the importance of combating invasive species within the protected area.

This questionnaire also evaluated the quality of the blueprints distributed by the project team while informing the citizens about the project's objectives and the activities to be carried out. After the meeting, a feedback questionnaire was filled in; 240 evaluation questionnaires were validated. There were six closed and one open question, two questions regarding the importance of combating invasive species and the importance of cooperation between protected area administrations and local communities, and four questions regarding the effectiveness of the meetings. Because the questioned group was equable, all of them being a local community representative, we didn't find it relevant to collect personal information (age, income, education), and the questionnaire was focused on attitude and opinion only.

The attitude is a tendency of humans to agree or disagree with a statement or an action, to consider important or not important the consequences their actions may produce. The questions and scaling used during the assessing of awareness meeting are presented in Table 3. The questioned people live in similar economic and ecological conditions, they are facing almost the same problems regarding the invasive species and as a result, they share similar attitudes. The data were processed by SPSS software and mainly consisted in principal component analysis.

## 4. Results and discussion

Studies underlined that local communities usually are uninformed about IAS and actions need to be undertaken (Jelena at al. 2016) while other scholars show that low public support could be determined by disagreements on the moral value of public awareness (Novoa et al. 2017, Schreck et al. 2013). Gallardo et al (2017) estimated that invasive species are 11% -18% significantly lower inside a protected area than outside it. It is underlined that in a quarter of Europe's marine and terrestrial areas protected, an invasive species is present, and this action may compromise the biodiversity and the ecosystem service as well. For a protected area a specific guideline, certain management actions are necessary (Genovesi and Monaco, 2013).

Controlling invasive species often generates conflict with local communities and this social component has to be carefully considered in designing the IAS controlling strategy. During the awareness

meetings at the Mureș Floodplain Natural Park, it was observed that some local communities are against interventions of any sort due to a strong sense of proprietary feeling for their land. An important economic issue was manifested because the cost of interventions is really high, making it impossible for the owners to pay the costs of getting rid of the IAS on their own. Standard Deviation was calculated (Table 1), showing that the he distribution of data from the survey is closely grouped.

The communalities (Table 2) show that all questions have been correctly understood, since all values are next to one. However, the loadings shown in Table 3 give a clearer picture on the structure of the five components: the first component is dominated by the answers given to the first two questions, referring to the importance of the meetings, on the one hand, and the importance of measures to combat IAS. The quality of the promotional materials disseminated through the meetings' attendees were highly evaluated (the average rank is 4.65, quite close to the highest rank) but their relevance is very low, since their loading is significant within the third component only. The overall common sense refers mainly to the meetings and the combat measures, and lesser to the quality of the specialists' presentation and printed materials disseminated throughout the local communities.

Data stored if the last column of Table 2 shows that the extracted components stand well for the initial variables, meaning that PCA did not distort the statistical interpretation of all answers given to the closed questions. Table 4 summarizes the questionnaire results. It is noticed that following the application of the questionnaire, the communities have considered the awareness meetings as very important to communities; thus 53% consider these meetings very important, and 39% consider them important, 8% important enough.

These meetings are useful for both parties involved, being opportunities to debate and clarify the various important issues faced by local communities. Analyzing how respondents consider the importance of combating measures of invasive species, 58% consider these measures to be very important, 36% consider them important measures and 6% important enough and the intervention is highly appreciated.

Regarding the research results of the specialists, it is noticed that the communities' representatives considered these to be very important at 75%, 22% of the respondents considered as being important. It is understood that we are dealing with open-minded people, willing to find out and to receive new information, who view such dissemination sessions as necessary. Considering that a large part of the meetings was allocated to the locals to debate and to put questions, they were then asked how satisfied they were with the answers to their questions. The results shown that 55% consider the answers were very good, 39% consider that they have received good answers and only 5% think the answers were moderate and 1% consider them weak. It can be seen the results determined by a good approach and training of project specialists. The quality of information received by locals through the awareness visits was as being very good by 67% respondents, while 32% considered it was good, and only 1% moderate.

When it comes to the section of open questions meant to provide insights into local usage of the three IAS, we found that local people use the IAS for ornamental purposes, and the beekeepers regard *F. japonica*, as an alternative melliferous plant. All these people have no idea about how harmful IAS is to the local ecosystem.

**Table 1.** Descriptive statistics of surveys

| | ***N*** | ***Minimum*** | ***Maximum*** | ***Mean*** | ***Std. Deviation*** |
|---|---|---|---|---|---|
| How do you evaluate the importance of meetings between the Mures? Floodplain Natural Park Administration and the local communities? | 240 | 2 | 4 | 3.45 | 0.638 |
| How do you evaluate the importance of the measures to combat invasive plant species within the protected area? | 240 | 2 | 4 | 3.52 | 0.613 |
| How do you weigh the importance of the specialists' presentations? | 240 | 1 | 4 | 3.70 | 0.556 |
| How do you appreciate the quality of replied answers? | 240 | 1 | 5 | 4.47 | 0.671 |
| How do you weigh the quality of information received | 240 | 3 | 5 | 4.66 | 0.491 |
| How do you appreciate the quality of the promotional materials | 240 | 3 | 5 | 4.65 | 0.520 |

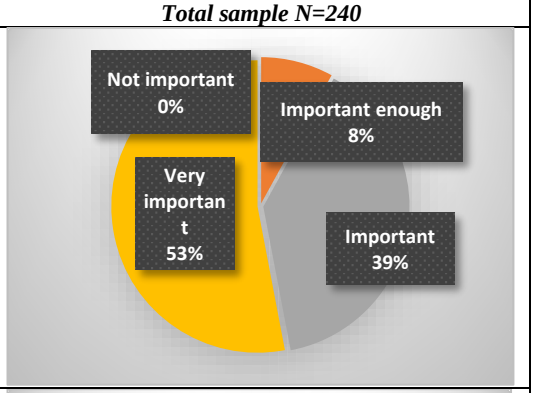
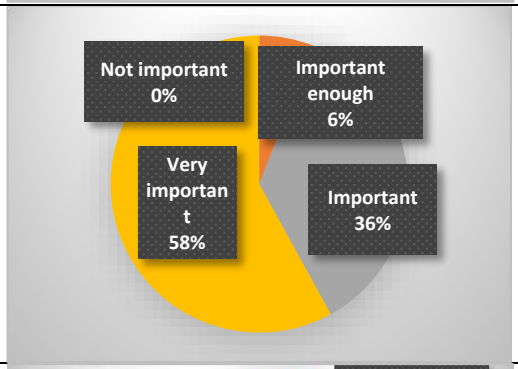
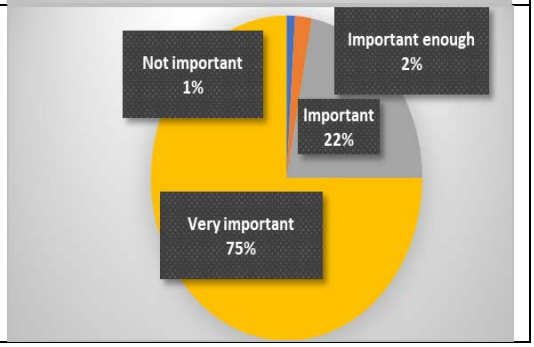
**Table 2.** Communalities after extraction

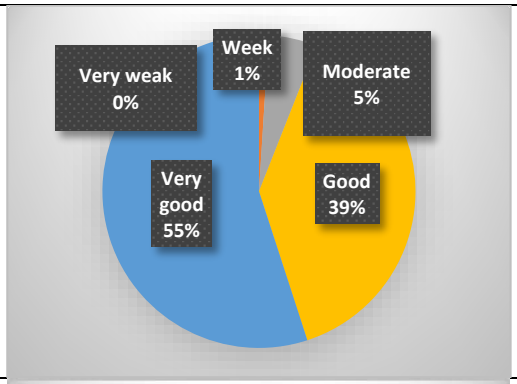
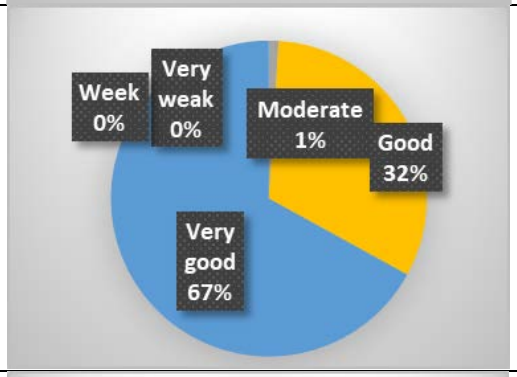
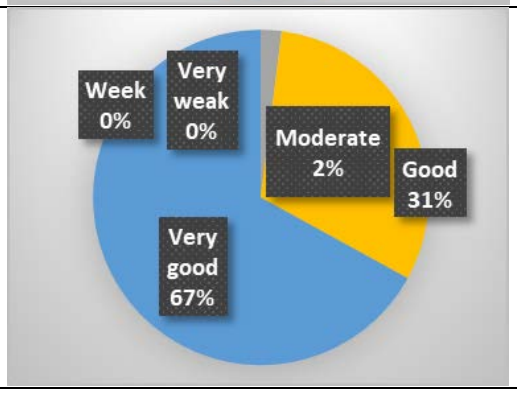
| | ***Initial*** | ***Extraction*** |
|---|---|---|
| How do you evaluate the importance of meetings between the Mureș? Floodplain Natural Park Administration and the local communities? | 1.000 | 0.920 |
| How do you evaluate the importance of the measures to combat invasive plant species within the protected area? | 1.000 | 0.864 |
| How do you weigh the importance of the specialists' presentations? | 1.000 | 0.990 |
| How do you appreciate the quality of replied answers? | 1.000 | 0.999 |
| How do you weigh the quality of information received | 1.000 | 0.997 |

**Table 3.** Rotated Component Matrix[a]

| | *Component* | | | | |
|---|---|---|---|---|---|
| | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
| How do you evaluate the importance of meetings between the Mureș? Floodplain Natural Park Administration and the local communities? | 0.897 | 0.128 | 0.173 | 0.160 | 0.211 |
| How do you evaluate the importance of the measures to combat invasive plant species within the protected area? | 0.778 | 0.339 | 0.253 | 0.244 | 0.143 |
| How do you weigh the importance of the specialists' presentations? | 0.291 | 0.854 | 0.216 | 0.273 | 0.234 |
| How do you appreciate the quality of replied answers? | 0.272 | 0.269 | 0.199 | 0.864 | 0.258 |
| How do you weigh the quality of information received | 0.256 | 0.231 | 0.276 | 0.261 | .857 |
| How do you appreciate the quality of the promotional materials | 0.282 | 0.207 | 0.878 | 0.192 | 0.260 |
| Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. | | | | | |
| a. Rotation converged in 6 iterations. | | | | | |

**Table 4.** Results on assessing awareness of local communities towards invasive species

| ***Variable description*** | ***Total sample N=240*** |
|---|---|
| How do you evaluate the importance of meetings between the Mureș Floodplain Natural Park Administration and the local communities? |  |
| How do you evaluate the importance of the measures to combat invasive plant species within the protected area? |  |
| How do you weigh the importance of the specialists' presentations? |  |

| | |
|---|---|
| How do you appreciate the quality of replied answers? |  |
| How do you weigh the quality of information received? |  |
| How do you appreciate the quality of the promotional materials? |  |

During the meetings the informative materials were appreciated, especially because they offer useful information to identify IAS, but the most relevant part of the meetings was the shift in people perception regarding the importance of combating IAS, proving that awareness meetings are a valuable instrument for IAS combating. The survey is coming to validate this instrument. Awareness rising methodology end evaluation indicators are text book for protected areas administration, being an important part in education programs and stakeholders' meetings (Ervin, 2003; Leverington et al., 2008). The support of local communities is essential for achieving the conservational status and after all for all of us benefit, human society and nature (McNeely, 1994).

## 5. Conclusions

Apparently, at least in Romania, invasive species have not yet received the attention they deserve. IAS determine a negative impact on biodiversity by altering the natural habitats, affecting the structure and the functioning of the ecosystem. Raising the public and decision-makers' awareness is one of the strongly recommended actions, essential for empowering preventive actions al local level in close partnership with the natural reserve administration. Small-scale actions are also important for effective monitoring, in which local communities shall also be involved.

Mureș Floodplain Natural Park is facing threats from three major invasive species: *Amorpha fruticosa L.*, *Acer negundo L.*, *Fallopia japonica L.* Corroborative actions were undertaken to find the most sustainable way of combating the three IAS by taking direct intervention and raising the awareness of local communities. Being the first action of this type, it was very important, from a strategical point of view, to look deeply into local community approach on the problem.

As a result of awareness-raising activities, local communities believe overwhelmingly that meetings with the Administration of the Mureș Floodplain Natural Park were appropriate and the measure to combat invasive species are welcome and important. The park administration planed regular meetings with local communities, as its action plan for Management Plan implementation, but it is for the first time when a close survey was done, especially for a new problem

that was appointed to local communities, in their majority on rural space.

As far as they identify a common problem, a communication and efficient channel was established though this meetings, local communities are open to common future activities. A financial mechanism is needed to support these interventions for combating invasive species.

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