

***In situ* botanical gardens: a case study in Zagori, Greece**

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Abstract

Environmental tourism is a major economic activity in many rural areas of Greece. For this kind of tourism the variety and rarity of local flora is an important pole of attraction. Among the actions and measures that could be taken for the promotion of local flowers, is the creation of *in situ* botanical gardens, where the visitors can get an integrated picture of the representative flora of each region.

These gardens in order to fulfill their mission, they should meet certain terms and conditions such as: easy access, rich biodiversity (species and habitants) and the necessary human activity, which is essential for the maintenance of the footpaths and other elements of human and natural environments. A problem that must be managed for these kinds of gardens is the organisation of conducted tours. The problem arises because the cost of specialized staff can hardly be covered by the rural communities while the labeling of botanical species in a changing natural environment is a complex task.

The LIFE initiative of EU, gave the opportunity for the implementation of this concept. The application region was Zagori, a mountainous area in NW Greece. For the *in situ* botanical garden, an area of about 320 ha was chosen with all the above mentioned characteristics. The problem of the conducted tour was solved by issuing a guide-booklet, which helped the easy identification of the plants of the garden. This booklet was available for free to visitors from local hostels.

Evaluation of the operation of this botanical garden gave very satisfactory results for the first two years. Later, for various reasons, the garden stopped operating, but the final conclusion is that the creation of *in situ* botanical gardens has much to offer not only in local economy, but also in environmental awareness and education.

Background

Undoubtedly "The objects of botanical gardens must be mainly scientific and predominantly instructive" as Ferdinand Mueller (1825 - 1896), the director of the Royal Botanic Gardens of Melbourne (1852 - 1873) stated, about 150 years before. At the same time the operation of botanical gardens has a significant impact on the

local economic activity [1]. This effect is direct since it creates new jobs, but also indirect, since the gardens attract many visitors each year.

This dimension of botanical gardens, acquires considerable importance in areas where the economy is based on eco-tourism, especially on their abundant and rare flora. This happens in many rural and mountainous areas of Greece. In these areas the establishment and the operation of a botanical garden is not something easy to achieve. The reasons are mainly economic, since it requires high cost of establishing and running and their sustainability is extremely difficult to be ensured.

In these cases, the creation of *in situ* botanical gardens, under certain conditions, is a remarkable alternative. Of course these gardens are in no way able to provide the quality and quantity of services, offered by organized and systematic botanical gardens. Their operation, however, has much to offer not only in local economy, but also in environmental education and relevant public awareness.

Conditions for the establishment of *in situ* botanical gardens

The creation of an *in situ* botanical garden must meet certain requirements, in order to fulfill its objectives. These conditions should be:

- 1. Biodiversity of habitats.** This makes the visit much more interesting, as the visitor has the opportunity to enjoy both a botanical garden and a landscaped one.
- 2. Biodiversity of species.** The visitors can easily obtain a complete picture of the flora of the region and to understand the complexity of relationships and interactions in the natural environment. The variety of species also attracts visitors and there is no monotony during the tour.
- 3. Safety.** These gardens accept guests of all ages and their safety during the tour should be assured. Dangerous footpaths or passes over rushing streams and steep slopes must be secured with the necessary protective structures. It should also be placed warning signs for poisonous plants or fruits, and generally measures for the safe tour of visitors.
- 4. Selection of the location.** The choice of a location of an *in situ* botanical garden should ensure:
 - Easy access for the visitors and
 - the balanced growth of the region

Although this condition seems obvious, the choice of a suitable location is not easy, due to the intense mountainous landscape in many regions of Greece.

5. Elements of cultural heritage. The Greek countryside is full of small churches, stone bridges, terraces, water mills and many other elements of old time human activity. It would be extremely interesting if such elements exist within the gardens, indicating the harmony between natural and human environment.

6. Support from the local community. The *in situ* botanical gardens are not able to employ permanent staff, since they do not have the income like the organized botanical gardens. For this reason, their existence and operation is mainly based on the support of local community and volunteerism. Without this support the life span of these gardens is limited.

The case study of Zagori

The establishment and the operation of the garden. Zagori is a mountainous region in northwestern Greece with rich natural and cultural heritage. In this region from

1998 till 2002 a project for conservation of terraces was applied, in the frame of the EU Initiative "L.I.F.E." The leader partner of this project was the Prefecture of Ioannina, while the Technological Educational Institute (TEI) of Epirus was the scientific advisor of the project. The Department of Floriculture and Landscape Architecture of TEI proposed the establishment of an *in situ* botanical garden, as the project area met many of the conditions mentioned above. The partners of the project accepted the proposal and 320 ha were defined for this purpose near Negades village (WGS84: 39.86291°E, 20.847416°E) (Figure 1).

The area is characterized by remarkable biodiversity of habitats and plants (for instance more than 400 plant species were identified). There are also cultivated terraces (Figure 2) with traditional crops, two small streams, forests and glades (Figure 3). Apart from the terraces, there are two stone bridges (Figure 4) from the 19th century, emphasizing the consistency of man and nature.

The working group, under the guidance of the scientists of the Department of Floriculture and Landscape Architecture of TEI, opened new paths, placed information signs, built new stairs in steep parts of the area and placed protective railings at several passes of the route. All these constructions ensured a pleasant, educational and safe route for the visitors.

The conducted tour was managed by issuing a guide-booklet in Greek, under the title "Botanical routes" (Figure 5), which helped the easy identification of the garden's plants. This solution was preferred because the cost of specialized staff could hardly be covered by the project or by the local authorities, while the labeling of botanical species in a changing natural environment is a complex task.

The guide-booklet was divided into three parts. In the first one, there was a schematic map of the garden with the various habitats of the area (Figure 5). The second part obtains the photographs and the description of nearly 170 plants, as well as the habitat, in which the visitor could find each of them. The plants were categorized according to their blooming season in 4 groups, for easy identification by the visitors. Finally the third part of the booklet was an alphabetical list of the scientific and common names of plants of the garden.

Five hundred guide-booklets, in Greek, were printed and distributed to the local hostels. The guide-booklets were available for free to the tourists who wanted to visit the garden, after their commitment to complete a questionnaire concerning the impressions of their visit.

Evaluation of the *in situ* botanical garden

The evaluation was performed by analyzing 228 of the above mentioned, questionnaires during 2001 and 2002. The analysis revealed the following conclusions:

1. The 62% of the tourists were satisfied or very satisfied with their visit to the botanical garden.

2. The 38% of the tourists were moderately or not at all satisfied.

The reasons for their satisfaction or not, are shown in Figure 6.

3. The 74% of the visitors had at least one suggestion for improving the operation of the garden. The majority of the above suggestions (about 53%) had to do with the desire of visitors to have more information about the existing traditional crops, the history of the stone bridges, the terraces and other elements of the human

environment. This finding reflects the need of the tourists to visit something different in areas with natural beauty such as Zagori.

The following remarks are also worth to be mentioned:

- Most of the negative opinions came from tourists who visited the garden during winter. These negative opinions reached the 68% for this period.
- The 38% of tourists extend their stay in the area for another night, in order to visit the garden.

For the first two years the operation of the garden was satisfactory. Gradually, after the termination of the project, the garden was abandoned by the implicated organisations. The paths were downgraded or even destroyed due to a lack of maintenance. The existing traditional crops were abandoned and many terraces collapsed. It is obvious that the local authorities did not understand the importance of the garden for the tourism and environmental awareness. Today they have realized their mistake and try to find the necessary funds to build again the *in situ* botanic garden.

Conclusions

Based on the results of the evaluation and on the owners' opinion of the hostels of the area, it is concluded that the operation of the *in situ* Botanical Garden was positive for the region.

The garden also helped the visitors to form a complete picture of the flora of the area, to understand the concept of biodiversity and to become more sensitive to environmental issues. Finally the great profit from the whole effort is the gained knowledge. Both the local municipality and the TEI have understood that a new approach is needed for the establishment and operation of such kind of gardens.

The key points of this new approach are:

1. The promotion, the design of infrastructure, as well as the rules for the operation of the *in situ* botanical garden will be under the supervision of a scientific committee. The members of this committee will come from the scientific staff of TEI of Epirus, the University of Ioannina and other scientific organizations of Epirus.
2. The botanical garden should be redesigned by the Department of Floriculture and Landscape Architecture of TEI of Epirus, with the assistance of experts on botanical gardens.
3. The local Municipality will be responsible for maintaining the garden's infrastructure. The cost for the maintenance may be derived from the budget of the municipality, donations, selling souvenirs, sponsoring, etc. [2].
4. The conducted tours in the garden can not be based only on guide-booklets. This will be done by trained volunteer staff, as it happens in many well-known botanical gardens [3].
5. The local Municipality, in collaboration with the local Government, should initiate specific actions to promote the botanical garden in order to become widely known. These actions may be included into existing projects of Epirus' region.
6. The Scientific Committee of the *in situ* Botanical Garden, in cooperation with the regional services of the Ministry of Education, as well as in cooperation with the hostel owners will design and will implement a project of school visits, educational courses [4], summer schools or other models of environmental education [5]. This

project will promote the environmental education and awareness of a crucial public for the future of the region.

7. Information technology in promoting and improving the functionality of the garden by creating internet site, GPS information, relevant smartphone applications, etc. should be applied.

Apart from the implementation of the above proposals, for the long and successful operation of the *in situ* botanical garden is necessary and essential the support from the local community. The existence of the garden will not only help the local economy but will be vital in conservation and protection of a unique natural environment in Greece and Europe.

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Figure 1. Map of the area



Figure 2. Cultivated terraces with traditional crops



Figure 3. A glade of the *in situ* botanical garden with orchids



Figure 4. One from the two bridges of the garden

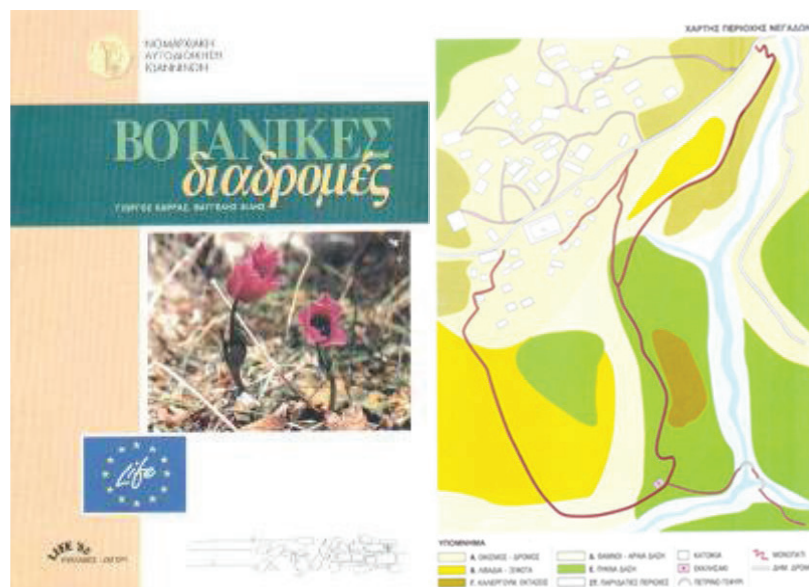


Figure 5. The guide book in Greek, under the title «Botanical routes» and the schematic map of the habitats of the garden in the guide book

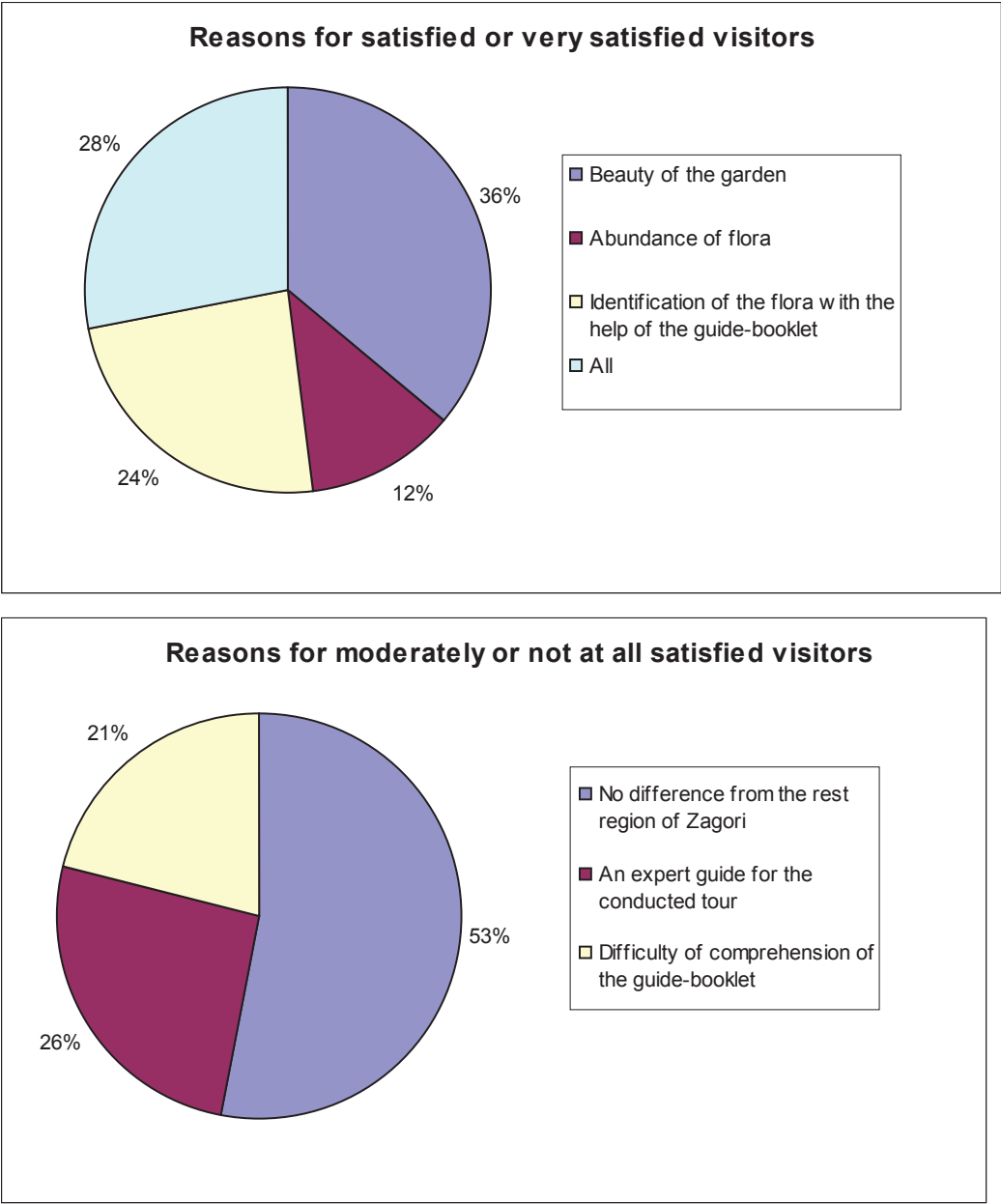


Figure 6. Reasons for satisfied or not satisfied visitors