

# A topographical approach to survey environmental adaptation assessment on a mountain trail as a pathway to local prosperity

MOUTSOPOULOS D.<sup>1</sup>, STERGIADOU A.<sup>2\*</sup>, and PSILOVIKOS T.<sup>3</sup>

<sup>1</sup>MSc Candidate at "Sustainable Management of Forest and Natural Ecosystems: Protection, Production and Utilization", A.U.Th., M.Mpotsari 59, 54644, Thessaloniki, Greece

<sup>2</sup>Associate Professor, School of Agriculture, Forestry & Natural Environment, Institute of Forest Engineering & Topography, Aristoteles University of Thessaloniki, P.O. Box: 226, Zip Code: 54124, Thessaloniki, Greece.

<sup>3</sup>Laboraty teaching staff, Institute of Forest Engineering and Topography, Department of Forestry and Natural Environment, Aristoteles University of Thessaloniki, Mosxounti 3, Foinix, 55133, Thessaloniki, Greece

\*corresponding author: Stergiadou Anastasia  
e-mail: nanty@for.auth.gr

**Abstract.** Mountainous trails represent unique ways into the wild nature. No matter the difficulties or the hours of reaching the end point of a mountain trail; the joy of hiking to desirable and adventurous places makes the hikers the happiest persons. The need of a topographical approach to survey mountainous trail lead us to use TruePulse 360B – laser technology techniques and digitally mapping in order to select and analyze a trail in a forested area based on environmental adaptation assessment. Since ancient times mountain trails were pathways to local prosperity because they were used for commercial trades. In modern world mountain trails are used for hiking, recreational walks in nature, as an introduction way of new ages in the wild forests by persons in wheelchairs or disable people (deaf, blind, down- syndrome, etc). The aim of this paper is not only to provide a digital map for visiting and exploring the natural beauty near by the Wild Life Museum of various tourist teams especially disable ones; in order to manage the wild trails for the benefit and prosperity of the local community; but also to examine the environmental adaptation of this trail by taking into consideration the protection of the nature.

**Keywords:** mountain trail, disable pathway, local prosperity, environmental adaptation assessment, topographical approach

## 1. Introduction

Mountain pathways are the historic monument of humankind that connect the 21<sup>st</sup> century with the ancient times when people can move from one place to another by using trails in nature. Nowadays hiking at mountain trails is an athletic activity or is a part of touristic attraction nearby famous areas like Olympus Mountain, etc. Nature-based tourism and recreation activities (Thiene & Scarpa, 2008) have led to a consistent increase in the number of visitors to mountainous terrain (Marta et al, 2014). The European Community institutions have encouraged multifunctionality built on respect for the environment, promotion of the local culture, greater integration of rural

and urban worlds and the capacity to provide ecosystem resources (Comision Europea, 1999; Dwyer et. all, 2003; Van dr Ploeg, et. all, 2003; Stürck, et. all 2017; Faludi, 2013). Diversifying local economies helps reduce conflicts and optimizes benefits, making both space and time more efficient (Kato, 2009). From a developmental point of view and due to their geomorphological characteristics and sensitive ecosystems, mountainous regions also present intrinsic disadvantages related to the modernization of their traditionally extensive economic production base or the creation of modern competitive production activities (Stergiadou, 2001; Soutsas et all, 2006).

A trail can be planned and managed as a means to help protect and enhance a natural area. If planned and built correctly, a trail will: a) Keep trail users on a designated path; b) Introduce residents to natural areas, encouraging a sense of ownership and stewardship; c) Focus resources on natural areas where trails are being managed for invasive species removal, trail closures, restoration and natural area expansion; d) Increase awareness of natural environment issues through user experience and interpretive programming, and e) Provide for the most effective and efficient use of resources in the maintenance and management of infrastructure and natural resources, while optimizing cost/benefits.(City of Toronto, 2013).

Etching mountainous paths for the disabled is a big challenge since the need of some quality time in nature is rising every year. So as lovers of nature lovers we searched for hiking opportunities to get to know the Greek landscapes. But despite the countless guides and websites dedicated to hiking we couldn't find the information it's needed to know if a hike was right for disabled hikers. So we research the greek legislation in order to find instructions for planning one hiking trail for disabled.

A big question that comes up in any conversation about disability and access to the outdoors is this: What are the barriers? Berman (2020) provides just a few of actionable items that can be done: a) Drastically Improve Signage, b) Visual Barriers at Seat Height, c) widening trail entrances,

d) more seating that's marked on a map. Antonneli et al in 2017 suggest that for off-road mobility, some manual or power assisted devices can be conceived to be self-driven by paraplegics while for tetraplegics non power-assisted devices may be conceived.

In this research throughout a topographical approach to survey environmental adaptation assessment on a mountain trail as a pathway to local prosperity we tried to bridge the technical requirements of designing a mountain interaction trail adjacent to a Natural History Museum with the needs of disabled visitors.

## 2. Research Area and Methodology

Taxiarchis Chalkidikis was chosen as researched area to provide a planning strategy for forest paths and their impact on the opening up of forest areas, recreation and tourism and the importance of their technical specifications as well as the legal framework that governs their construction and operation, highlighting the importance of forest paths for local communities, tourists, the disabled but even for nature itself. The Forest Museum, which has been operating since 2008, in University Forest of Aristoteles University of Thessaloniki displays both the flora and fauna of the area, as well as its natural resources, is the starting point and the end of the proposed path.

TruPulse 360B laser technology topographical equipment and the GGRS 87 – application for coordination's were used in order to produce a topographical approach to survey environmental adaptation assessment on a recommended mountain trail (Fig 1).



**Figure 1.** Topographical approach of recommended mountain trail adjacent to a Natural History Museum at Taxiarchi Chalkidiki, Greece

The aim of this work is to create an easy path for hikers, which will provide both recreation and education, as it will frame the University Facilities of the University Forest Taxiarchis - Vrastamon. This path can be a part of the visit of the University Forest Museum and the various other facilities that exist and at the same time it will be connected to the already existing trails of Cholomonta Mountain as an environmental interest visit to the area. We relied on the Greek legislation regarding the definition of technical specifications for the design, marking, opening and maintenance of mountaineering - hiking trails (ET. B' 206/30.01.2017). Categories of mountaineering - hiking trails: A. Depending on the use of mountaineering - hiking

trails, approach areas, length, degree of difficulty and their type, they are divided into the following categories: 1) Long-distance trails, 2) Short-distance trails, B. Depending on their importance, mountaineering - hiking trails are divided into: 1) Primary mountaineering - hiking trails, which are of great importance that combine all the purposes of mountaineering trails. 2) Secondary mountaineering - hiking trails which are mainly branches of the primary mountaineering - hiking trails and have a shorter length. Types of mountaineering trails: 1. the mountaineering - hiking trails depending on the purpose they serve and the space they develop, are divided into different types: a) Recreation - entertainment paths (R-E), b) Educational – thematic (learning) paths (L), c) Bicycle paths (B), d) Trails accessible to the disabled (A), e) living paths (domestic) (D).

As path planners and foresters we decided to design a pathway for disabled and for blind people who wants to have experiences into the nature. The paths that are accessible to the disabled (AD), may belong to the recreational paths (R-E), to the educational - thematic paths (L), to the cycling paths (B), but they can also be special paths made to serve this special category of users or for therapeutic purposes. The opportunity to visit places in nature is a right for all social groups, especially for people who cannot come unaccompanied to such places that may bring them mental uplift and empowerment.

## 3. Results

### 3.1. Planning Design of pathway

To design a new circular type of path for disabled using the speedometer gave us a form of path of low degree difficulty with a part of steep terrain with slope up to 15%. The coordination's that GGRS 87 provide us our first planning design on field of a new circular trail for disable (Fig. 2).

In this part of the pathway in order to have an environmental adaptation we proposed to use: a) wooden deck for the disable, b) yellow concrete tiles with special notches to guide blind visitors and it is also proposed c) an aluminium support bar in places where the slope of the path exceeds 5% ground slope.

### 3.2. Proposed pathway for disable and blind as prosperity plan

After the field measurements, the control of stability, the possibility of accessibility in wheelchairs, to the blind, the path was defined on an orthophoto map using GIS program with possibilities for uses by the disabled and the blind hikers.

A walking path that follows the natural route of Forest Museum, as a part of the visit to the University Forest offers both a more meaningful type of tourism and an innovative approach to development. An increasing trend in global tourism: international adventure travellers seeking meaningful trips to places where few have gone before. They desire authentic and unique experiences that

do not entail traditional luxury and comfort. These travellers also seek higher ethical and corporate social responsibility standards and see themselves not so much as package tourists, but as contributors to new ideas, encounters and ways of traveling. Exploring small villages like Taxiarchis and places normally ignored by mainstream tourism is becoming part of that meaningful travel they seek. Healers and accompanying people of disable and blind prefer places nearby nature. Support for experiential and natural tourism offerings like university forest museum trail is also an innovative way to create jobs in poor, rural communities and reach often excluded groups such as women, youth, families, disable, blind and other less fortune groups of people in turn reducing poverty and boosting shared prosperity. Women are the key hosts along pathways in nature, managing and preparing lodging and food while not necessarily having to leave their homes (which is important in traditional, rural households). Local organizations can help boost the sale of local women’s handicrafts and traditional foods to walkers who pass through, or stay, in the village. Youth acquire and hone foreign language skills with walkers and gain an early leg up into their careers – while acting as guides to those passing through.

In addition to the economic gains generated from the path, communities benefit from increased social and natural capital – the respect, understanding, and knowledge gained as a result of welcoming outside visitors into their homes and communities. The longstanding Greek tradition of hospitality, based on mutual trust and reciprocity, is integral to the circular path which will frame Forest Museum of Taxiarchis and will connect local communities to other people and places, near and far. That kind of path for disable, blind and families “connects hikers to the world and brings them new experience and hope for

meaningful leaving.” The path helps shift outside perceptions and brings a renewed sense of local cultural identity.

#### 4. Conclusions

Planning a path in nature and nearby a Forest Museum gives the opportunity to construct with local materials as wood, stones, cement etc. that can give new prospects for the visitors of the areas.

Based on the number of hikers and visitors of the Forest Museum (1/3 of the cultural and social visitors) of the area it’s calculated that a part of them would bring with them friends with small kids or disable or blind if they knew that there is recreation activities also for that group of people.

The smells and the sounds of nature, the air filling and the hope that a disable and blind visitor of that kind can experience will help their phycology and give them strength to go on their life.

Furthermore, for the World Bank Group, non-traditional and experiential tourism such as path for disable and blind holds significant potential for generating income, jobs, and social capital not only across the Chalkidiki, but in other rural, marginalized, and conflict areas. To meet goals of reducing poverty and boosting shared prosperity, innovative approaches to tackling rural development, youth unemployment and women’s empowerment in excluded communities are much needed.

The future hope is that the Prefecture of Central Macedonia of Greece will plan and build paths for special group of people like disable and blind will reveal a more human profile of our culture.



Figure 2. 1<sup>st</sup> Planning Design on field of a new circular trail for disable





**Figure 3.** Map of a circular pathway of disabled and blind people

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